THE PROTURA OF THE BISMARCK ARCHIPELAGO AND SOLOMON ISLANDS

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CONTENTS

SYNOPSIS

An account is given, with keys, of the Protura of the Bismarck Archipelago and Solomon Islands, making use of recently acquired material in the Zoological Museum, Copenhagen, and the British Museum (Natural History). Twelve species, eleven of them new, are added to the single species previously known from this region.

INTRODUCTION

At the time of the senior author's revision of the world species of Protura (Tuxen, 1964) only one Melanesian species was known, *Silvestridia solomonis* (Imadaté) from Guadalcanal. Since then, much more material has become available from the following sources.

1. Noona Dan Expedition of the Zoological Museum, Copenhagen (1962), soil fauna samples from various localities in the Bismarck Archipelago and Solomon Islands (Petersen, 1966; Wolff, 1968). Specimens placed in Zoological Museum, Copenhagen.
2. Royal Society Expedition to the Solomon Islands (1965), soil samples placed in British Museum (Natural History), collections made by Mr P. N. Lawrence and Dr P. J. M. and Mrs P. Greenslade.
3. Collections of soil arthropods made by Dr and Mrs Greenslade in the Solomon Islands during the years 1964–1966, specimens placed in British Museum (Natural History).

We are grateful to Dr and Mrs Greenslade and to Dr Theresa Clay for making the last two groups of soil samples available to us.

In total, these samples contained 450 specimens of Protura from more than 35 different localities and proved to comprise 13 species belonging to three families. It is now possible for a synoptic study to be made of the species from these islands following the lines of Tuxen (1964), where details of the genera will be found, including diagnoses and keys for their separation. All figures are drawn from the holotypes.

We have followed the schemes proposed by Tuxen (1949) and Imadaté (1965 : 198), and for each species set out the chaetotaxy as follows: if all stages are known, setae are marked primary ('prim.'), secondary ('sec.'), tertiary ('tert.') and complementary ('compl.') for larva I, II, maturus junior and adult respectively. If larva I is not known, the chaetotaxy of the first known stage is marked 'composition of setae'. In the first column for every stage is given the formula according to Tuxen's system.

It should be noted that what Tuxen called no. 3 in the anterior row on the abdominal terga is here called '*P* 3', namely no. 3 in the posterior row. Tuxen (1964 : 62) noted that ' "3" of the anterior row is often situated behind the other setae of this row and may in terg. VII lie so far back that it can be reckoned as belonging to the posterior row'. As shown by Imadaté (1965 : 197) from a study of postembryonal development of the chaetotaxy, actually the reverse is the case: it is *P* 3 from the posterior row which is placed anteriorly in some of the abdominal tergites. This should be taken into consideration when comparing our 'formulae' with the earlier ones by Tuxen and others.

The following abbreviations are used for depositories of material cited in this paper.

BMNH	British Museum (Natural History), London
KU	Kyoto University, Kyoto, Japan.
UZM	Universitetets Zoologiske Museum, Copenhagen, Denmark.

LIST OF LOCALITIES

On the map (Text-fig. 76) the collecting sites are numbered as follows (the island in italics).

Bismarck Archipelago (*Noona Dan Expedition*).

1. Boliu, *Mussau*, 4.vi.1962. Soil with rotten leaves.
2. Malakata, *Mussau*, 11.vi.1962. Soil and half-rotten leaves, primary forest.
3. Banatam, *Lavongai*, 20–26.iii.1962. Half-rotten leaves and soil. Mangrove swamp (20.iii) and primary forest (26.iii).

4–5. Sumuna and Kollepine, *Dyaul*, 7–12.iii.1962. Half-rotten leaves and soil, primary forest.

6. Lemkamin, *New Ireland*, 23.iv.1962. Grass tufts and soil, 900 m.
7. Manuan, *Duke of York*, 21.vii.1962. Soil, secondary forest.
8. Valoka, *New Britain*, 13.vii.1962. Soil and litter, primary forest.

Solomon Islands (*P. J. M. & P. Greenslade* and *P. N. Lawrence* collections as well as two sites from *Noona Dan Expedition* (No. 28 & 34)).

9. Falomai village, *Mono*, Treasury group, 20.ix.1965. Soil.
10. Kuturasele, *Choiseul*, 23.xii.1965. Soil.
11. *Wagina*, Choiseul group, 25.v.1965.
12. Gizo, *Nusatupe*, New Georgia group, 4.vi.1965. Litter.
13. Kuzi, *Kolombangara*, New Georgia group, 6.xi.1965.
14. Buala, *Santa Isabel*, 14.xii.1964. Litter.
15. Tatamba, *Santa Isabel*, 27.ix.1965.
16. Yandina, *Russell*, 15.viii.1966.

16a. *Russell*, 18.iii.1965. Forest soil.

17. Vatilau, *Nggela*, Florida group. 14.vi.1965.
18. Soso, *Nggela*, 2.xii.1965. Forest litter.
19. Koela, *Savo*, Guadalcanal group. 1.vi.1965. Litter.
20. One Naika, *Savo*, 1.vi.1965. Litter.
21. Mt Austen, *Guadalcanal*, 330 m, 24.x.1964–10.viii.1966. Forest litter.
22. Mt Jonapau, *Guadalcanal*, 1100 m, 6.v.1965. Forest litter.
23. Mt Popamanaseu, *Guadalcanal*, 26.vi.1965. Forest litter.
24. Nr Malukuna, *Guadalcanal*, 9.vi.1966.
25. Betimatu, *Guadalcanal*, 31.xii.1964. Forest litter, bush.
26. Berande Point, *Guadalcanal*, 30.iv.1965. Forest litter, sea level.
27. Kukum, *Guadalcanal*, 15.xii.1964–14.vii.1966.
28. Honiara, *Guadalcanal* (*Noona Dan Expedition*), 4.viii.1962.
29. Lunga, *Guadalcanal*, viii.1966.
30. Dala, *Malaita*, 16.ii.1965. Forest litter.
31. Warahitor, *San Christoval*, 1.viii.1965.
32. *Bellona*, Rennell group, 28.v.1965. Garden litter.
33. Kagaba Bay, *Rennell*, 6.iv.1965. Litter and soil from Coconut-grove.

33a. Kagaba Bay, *Rennell*, 6.iv.1965. Rotten tree trunk, primary forest.

34. Niupani, *Rennell* (*Noona Dan Expedition*), 18–19.viii.1962.
35. Graciosa Bay, *Ndeni*, Santa Cruz Group, 6.iv.1965.

KEY TO THE KNOWN MELANESIAN PROTURA

1 Spiracles absent; only one or two pairs of the abdominal legs two-segmented (Acerentomoidea) 2
– Spiracles present; all three pairs of abdominal legs two-segmented (Eosentomoidea; only genus *Eosentomon*) 6
2 The two first pairs of abdominal legs two-segmented . . . ***Condeellum crucis*** (p. 346)
– Only the first pair two-segmented 3
3 Second and third pair of abdominal legs with only one seta ***Silvestridia solomonis*** (p. 336)
– These abdominal legs with two setae, a long subapical seta and a very short apical one 4
4 Striate band of abdominal segment VIII well developed ***Gracilentulus greensladei*** (p. 340)
– Striate band reduced (*Berberentulus*) 5

5 Body length ab.800 μm; sensilla *e* of foretarsus much shorter than *c*; *A* 1 missing in tergite V . . . . . ***B. buchi*** (p. 340)

– Body length ab.900 μm; sensilla *e* as long as *c*; *A* 1 present in tergite V ***B. rennellensis*** (p. 338)

6 Caput processus of female squama genitalis semicircularly rounded; *P* 2 on abdominal terg. II–VI displaced anteriorly. Foretarsal sensilla *t*–1 situated close to α 3, *b*′–1 absent, *P* 2 and 1″ on terg. VIII not displaced anteriorly, foretarsus 63 μm ***E. noonadanae*** (p. 367)

– Caput processus bent against median edge of stylus in a sharp angle; *P* 2 on terg. II–VI situated in a row with *P* 1 and/or *P* 3 7

7 Foretarsal sensilla *t*–1 placed at about midway between α 3 and α 3′, *b*′–1 present; *P* 2 and 1″ on abdominal terg.VIII not displaced anteriorly, stern.VIII with 0–7 setae 8

– Foretarsal sensilla *t*–1 placed close to α 3′, *b*′–1 absent; *P* 2 and 1″ on terg.VIII displaced anteriorly, stern.VIII with 2–7 setae 12

8 Accessory setae *P* 1*a* on abdominal terg.VI short, less than one-fifth of *P* 1 and situated in row with *P* 1 and 2. Abdominal terg.IV with *A* 4 and 5, terg.V–VI without *A* 1, 2 and 3 or *A* 1, 2, 3 and 4, terg. VII without *A* 1, 2, 3 and 4, terg. X–XI with 8 setae, foretarsus 94–104 μm . . . . ***E. oceaniae*** (p. 350)

– Accessory setae *P* 1*a* on terg.VI long, more than *P* 1 and situated in a row with the other accessory setae 9

9 Abdominal terg. X–XI with 8 setae, *P* 1*a* on terg.VII placed in a row with the other accessory setae. Terg.IV without *A* 3, terg.V–VI without *A* 1, 2 and 3, terg. VII without *A* 1, 2, 3 and 4, foretarsus 97–98 μm . . ***E. solomonense*** (p. 361)

– Abdominal terg. X–XI with less than 8 setae, *P* 1*a* on terg.VII placed in row with *P* 1 and 2 10

10 Terg.X with 4 setae (1 and 4). Terg.IV with 10 anterior setae (*A* 1, 2, 3, 4 and 5), terg.V–VI without *A* 1, 2 and 3, terg.VII without *A* 1, 2, 3 and 4, foretarsus 85–95 μm. . . . . ***E. sakura*** (p. 359)

– Terg.X with only 2 setae (4) 11

11 Terg.IV with 10 anterior setae. Terg.V–VI without *A* 1, 2 and 3, terg.VII without *A* 1, 2, 3, 4 and 5; female squama genitalis with latero-proximal sclerotization, foretarsus 70–76 μm . . . . . ***E. solare*** (p. 356)

– Terg.IV without *A* 1, 2 and 3 or *A* 1, 2, 3 and 4. Terg.V–VI without *A* 1, 2, 3 and 4 or *A* 1, 2 and 3, terg.VII without *A* 1, 2, 3 and 4; female squama genitalis without latero-proximal sclerotization, foretarsus 73–77 μm . ***E. melanesiense*** (p. 352)

12 Empodium of hind tarsus short and less than one-fifth claw length; foretarsal sensilla *a*′ placed nearer to α 3′ than to α 3. Terg. II–VI without *A* 3, terg.VII without *A* 1 and 3, foretarsus 95 μm . . . . ***E. guadalcanalense*** (p. 363)

– Empodium of hind tarsus long and more than one-third claw length; foretarsal sensilla *a*′ placed nearer to α 3 than to α 3′. Terg. II–VI with 10 anterior setae, terg.VII without *A* 1 and 3, foretarsus 57–62 μm . . . . ***E. notiale*** (p. 365)

ACERENTOMIDAE

One-hundred and twenty-three specimens from 14 localities are found in the present collection. They consist of four species, viz. *Silvestridia solomonis* (Imadaté), *Berberentulus rennellensis* sp. n., *B. buchi* sp. n. and *Gracilentulus greensladei* sp. n.

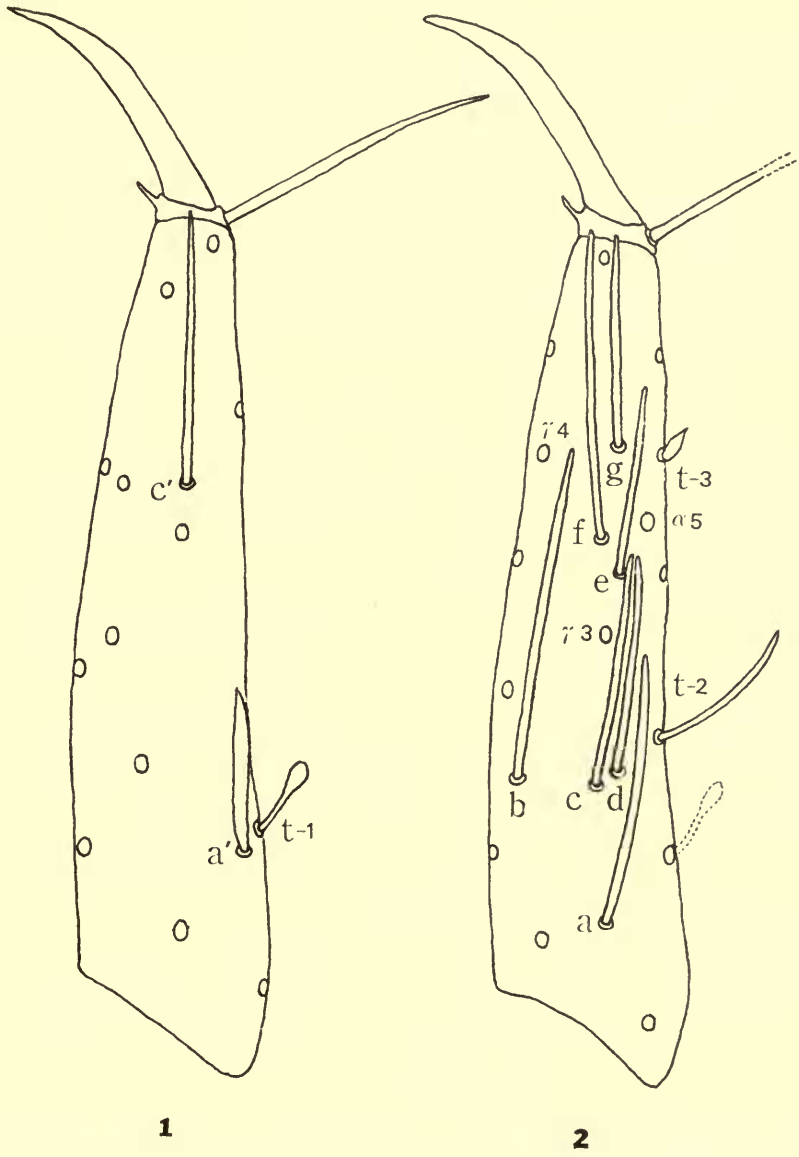
Silvestridia solomonis (Imadaté)

Acerentulus solomonis Imadaté, 1960 : 5–8. Holotype ♀, Solomon Is.: Guadalcanal, River Tantu, 20.ix.1958 (*T. Tokioka*) (lost).

Silvestridia solomonis (Imadaté) Tuxen, 1964 : 328–329.
Silvestridia solomonis (Imadaté); Tuxen & Imadaté, 1974 : 85–88 (redescription).

SPECIMENS EXAMINED.

SOLOMON ISLANDS: Savo, Koela, 1.vi.1965 (*P. J. M. & P. Greenslade*), 1 ♂, 4 ♀ (BMNH); Guadalcanal, Mt Austen, 11.ii.1965, 1 ♀; 21.iv.1965, 1 ♀; 24.v.1965,



FIGS 1, 2. *Berberentulus rennellensis*. Foretarsus, (1) interior and (2) exterior views.

1 ♀; 8.ii.1966, 1 ♀ (all *P. J. M. & P. Greenslade*) (all BMNH); G., nr Malukuna, 9.vi.1966 (*P. J. M. & P. Greenslade*), 1 ♀ (BMNH); Ndeni, Graciosa Bay, 6.iv.1965 (*P. J. M. & P. Greenslade*), 1 ♀ (BMNH).

Differs from other species of the genus *Silvestridia* by the absence of foretarsal sensilla *b'*.

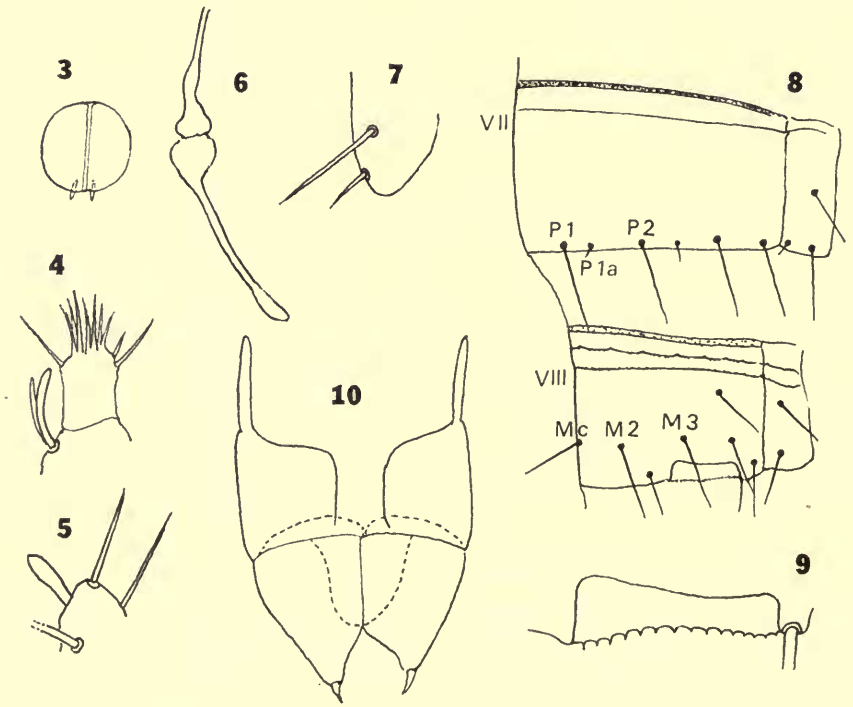
Berberentulus rennellensis sp. n.

(Text-figs 1–10)

Body length 900 μm in expanded adults.

Mouthparts small, sensillae on maxillary palpus slightly broadened, that on labial palpus distinctly broadened; pseudoculus almost circular, $PR = 13–14$; canal of the maxillary gland of the normal shape, its proximal part rather short.

Foretarsus 68 μm in length; claw with no inner flap; $TR = 3·3$; empodium short, $EU = 0·12–0·14$; position and shape of foretarsal sensillae similar to that of *B. yodai* Imadaté. Dorsal sensilla *t*–1 claviform, $BS = 0·41$; *t*–2 thin and *t*–3 small. Exterior sensilla *a* relatively long, apex almost reaching base of *γ* 3; *b* slightly broadened and extremely long, its apex slightly surpassing the base of *γ* 4; *c* situated close to *d* and subequal to *d* in length; apices of *c* and *d* not surpassing base of *α* 5; *e* as long as *c* and by far surpassing base of *g* and *t*–3; *f* thin and long and close to *e*; *g* slightly surpassing the tarsus. Interior sensilla *a'* broad and located in



Figs 3–10. *Berberentulus rennellensis*. 3, pseudoculus; 4, maxillary palpus; 5, labial palpus; 6, canal of maxillary gland; 7, abdominal appendage II; 8, dorsal chaetotaxy of abd. VII–VIII; 9, comb on terg. VIII; 10, female squama genitalis.

TABLE 1

Chaetotaxy of *Berberentulus rennellensis*

	Larva II		Adult	
	Formula	Comp. of setae	Formula	Tert. and compl. setae
(Dorsal)				
Th.I	4	1,2	4	
II–III	6	*A* 2,4, *M*	6	
	12	*P* 1,2,2*a*,3,4,5	14	*P* 1*a*
Abd.I	0		6	*A* 1,2,5
	10	*P* 1,2,2*a*,3,5	12	*P* 1*a*
II–III	0		6	*A* 1,2,5
	12	*P* 1,2,2*a*,3,4,5	16	*P* 1*a*,4*a*
IV	0		6	*A* 1,2,5
	14	*P* 1,2,2*a*,3,4,4*a*,5	16	*P* 1*a*
V	0		6	*A* 1,2,5
	14	*P* 1,2,2*a*,3,4,4*a*,5	16	*P* 1*a*
VI	0		4	*A* 2,5
	14	*P* 1,2,2*a*,3,4,4*a*,5	16	*P* 1*a*
VII	0		2	*A* 5
	14	*P* 1,2,2*a*,3,4,4*a*,5	16	*P* 1*a*
VIII	2–6	*A* 3, *M* 2,3,4	4–7	*A* 5, *M* ?*c*
	8	*P* 1,2,3,4	8	
IX	8	1,3,4,5	14	2,3*a*,4*a*
X			12	1,2,3,3*a*,4,5
XI			6	
Telson	9		9	
(Ventral)				
Th.I	2–2	*A* 1, *M* 1	4–2	*A* 2
	4	*P* 1,2	6	*P* 3
II–III	5–2	*A c*,2,3, *M*	5(7)–2	(*A* 4)
	2	*P* 1	4	*P* 2
Abd.I	3	*A c*,2	3	
	2	*P* 1	4	*P* 2
II–III	1	*A c*	3	*A* 2
	5	*P c*,2,3	5	
IV–VII	1	*A c*	3	*A* 2
	6	*P* 1,2,3	8	*P* 1*a*
VIII	4		4	
	0		0	
IX	4		4	
X			4	
XI			4(6)	
Telson	8		6	

row with *t*–1; *b'* absent; *c'* thin and a little distal to *α* 5, apex slightly surpassing the tarsus. Chaetotaxy (Table 1) similar to that of *B. nitidus* Imadaté & Yosii, but *P* 2 on abdominal stern. I present and *A* 1 on terg. VI absent, but present on terg. I–V. Abdominal appendages II–III with two setae each, the apical one less than half the subapical. The striate band on abd. VIII reduced, no distinct striae; comb on terg. VIII oblique, consisting of 12–13 minute teeth; female squama genitalis with pointed acrostylus.

Larva II. Foretarsus 50 μm. Chaetotaxy typical for the genus.

Holotype ♂, Solomon Islands: Rennell Island, Kagaba Bay, 6.iv.1965 (*P. J. M. & P. Greenslade*) (BMNH).

Paratypes. Same data as holotype, 1 ♂, 1 ♀ (BMNH).

This species closely resembles *B. yodai* Imadaté from southern Thailand in such characters as the position and shape of most of the foretarsal sensillae, in the absence of *b'* as well as in the tergal chaetotaxy of the abdomen, but it may be distinguished by the presence of *A* 1 on abdominal terg. IV–V.

Berberentulus buchi sp. n.

Body length 770–800 μm in expanded adults.

Mouthparts as in preceding species; pseudoculus almost circular, *PR* = 11–13; canal of maxillary gland of normal shape, its proximal part rather short.

Foretarsus 51–56 μm in length; claw with no inner flap, *TR* = 3·1–3·2; empodium short, *EU* = 0·16–0·18; position and shape of foretarsal sensillae similar to that of the preceding species, except that sensilla *e* is short, much shorter than *c* and just reaching base of *t*–3.

The chaetotaxy (Table 2) similar to that of the preceding species, but *A* 1 is always missing on terg. V, and sometimes also on terg. III–IV or even II (2 ♂ and 1 ♀ from Valoka). Abdominal appendages II–III, the striate band and comb on abdomen VIII and female squama genitalis as in the preceding species.

Muturus junior. Foretarsus 43–48 μm. Important characters such as foretarsal sensillae, canal of maxillary gland, etc. as in adult.

Larva II. Foretarsus 37–44 μm. Chaetotaxy typical.

Holotype ♀, Bismarck Archipelago: New Britain, Valoka, 13.vii.1962 (*Noona Dan Expedition*) (UZM).

Paratypes. Bismarck Archipelago: Mussau, Boliu, 4.vi.1962 (*Noona Dan Expedition*), 2 ♀, 1 l II (UZM); New Britain, Valoka, 13.vii.1962 (*Noona Dan Expedition*) 8 ♂, 8 ♀, 2 m.j., 2 l II (UZM).

The present species is named in honour of Mr Will. Buch who made the soil collections (as well as many others) on the Noona Dan Expedition. It is closely similar to the preceding species and *B. yodai* Imadaté from southern Thailand but, because of the difference in length of sensilla *e*, the body size and the different chaetotaxy of terg. IV–V, we prefer to regard it as a distinct species.

Gracilentulus greensladei sp. n.

(Text–figs 11–21)

Body length 700–810 μm in expanded adults.

Mouthparts of normal type, sensillae on maxillary palpus slightly broadened, that on labial palpus also broadened; pseudoculus almost circular, *PR* = 11–13; canal of maxillary gland of normal shape, its proximal part rather short.

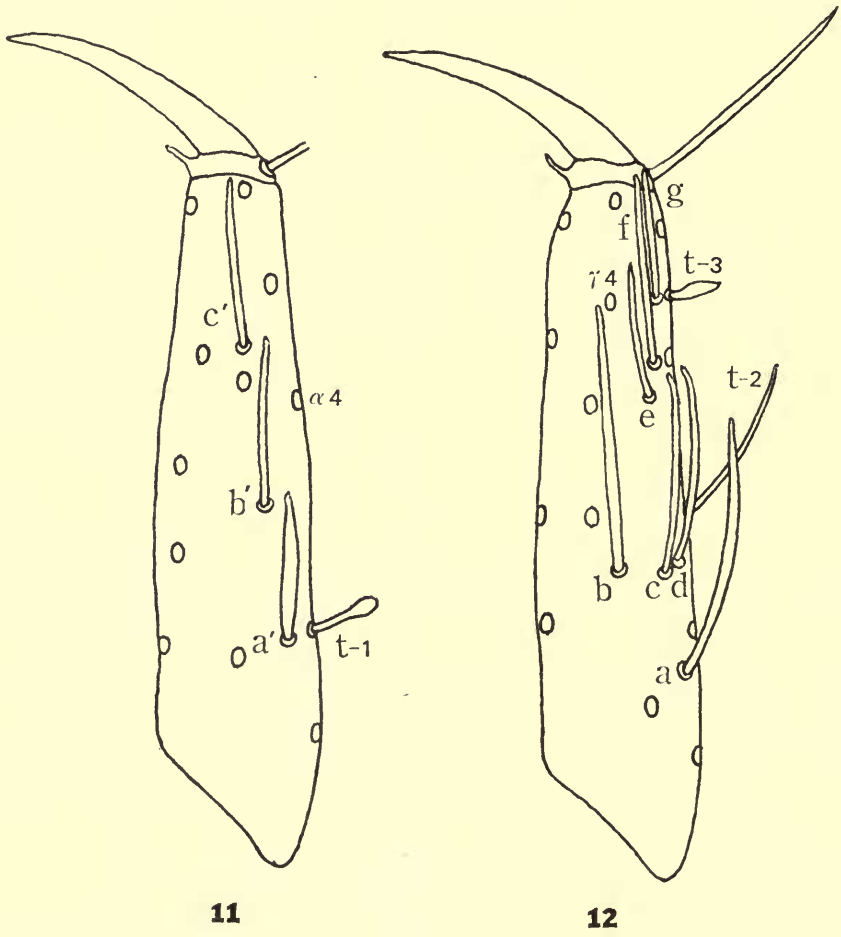
TABLE 2

Chaetotaxy of *Berberentulus buchi*

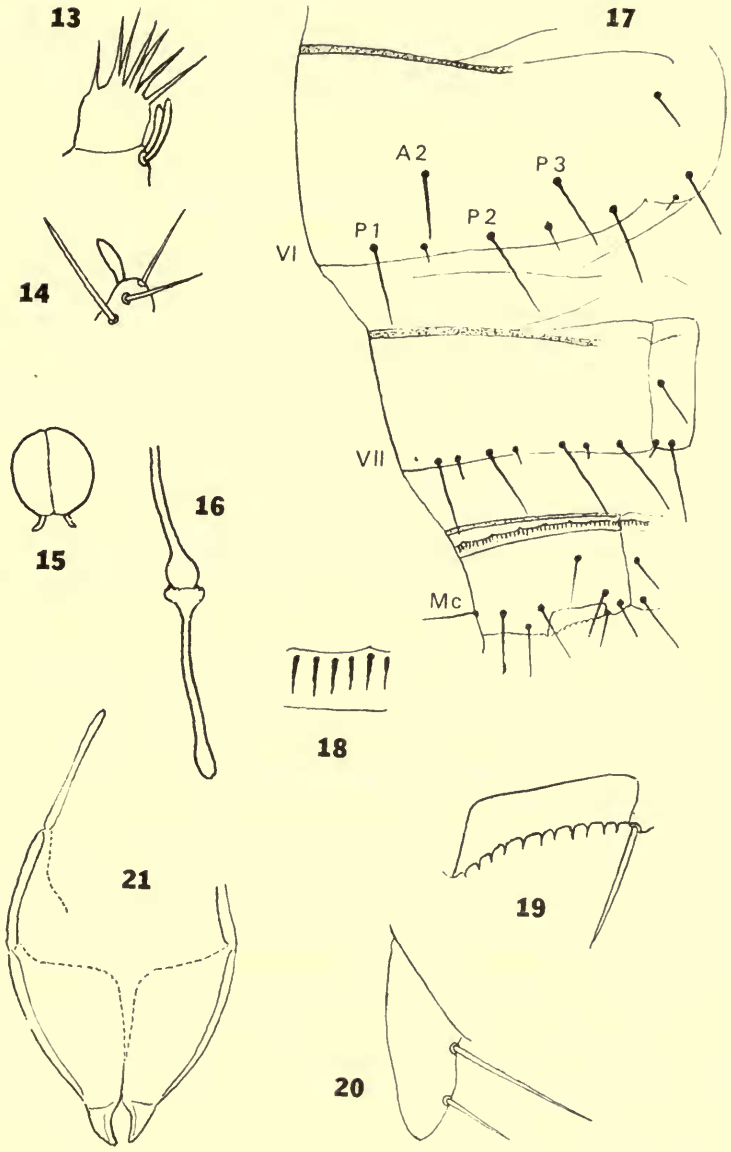
	Larva II		Mat. jun.		Adult	
(Dorsal)	Form.	Comp. of setae	Form.	Tert. setae	Form.	Compl. setae
Th.I	4	1,2	4		4	
II–III	6	*A* 2,4, *M*	6		6	
	12	*P* 1,2,2*a*,3,4,5	14	*P* 1*a*	14	
Abd.I	0		6	*A* 1,2,5	6	
	10	*P* 1,2,2*a*,3,5	10		12	*P* 1*a*
II–III	0		6	*A* 1,2,5	6	
	12	*P* 1,2,2*a*,3,4,5	14	*P* 4*a*	16	*P* 1*a*
IV	0		6	*A* 1,2,5	6	
	14	*P* 1,2,2*a*,3,4,4*a*,5	14		16	*P* 1*a*
V	0		4	*A* 2,5	4	
	14	*P* 1,2,2*a*,3,4,4*a*,5	14		16	*P* 1*a*
VI	0		4	*A* 2,5	4	
	14	*P* 1,2,2*a*,3,4,4*a*,5	14		16	*P* 1*a*
VII	0		2	*A* 5	2	
	14	*P* 1,2,2*a*,3,4,4*a*,5	14		16	*P* 1*a*
VIII	2–6	*A* 3,*M* 2,3,4	4–7	*A* 5, *M* c	4–7	
	8	*P* 1,2,3,4	8		8	
IX	8	1,3,4,5	12	2,4*a*	14	3*a*
X			8	1,3,4,5	12	2,3*a*
XI			6		6	
Telson	9		9		9	
(Ventral)						
Th.I	2–2	*A* 1, *M* 1	4–2	*A* 2	4–2	
	4	*P* 1, 2	6	*P* 3	6	
II–III	5–2	*A c*,2,3,*M*	5–2		5(7)–2	(*A* 4)
	2	*P* 1	4	*P* 2	4	
Abd.I	3	*A c*, 2	3		3	
	2	*P* 1	4	*P* 2	4	
II–III	1	*A c*	3	*A* 2	3	
	5	*P c*,2,3	5		5	
IV–VII	1	*A c*	3	*A* 2	3	
	6	*P* 1,2,3	8	*P* 1*a*	8	
VIII	4		4		4	
	0		0		0	
IX	4		4		4	
X			4		4	
XI			0(2)		4(6)	
Telson	8		6		6	

Foretarsus 51–56 μm in length. Among 76 adult specimens from seven different localities no local variation was found in the foretarsal length. Claw with no inner flap, $TR = 2{\cdot}8–3{\cdot}1$; empodium short, $EU = 0{\cdot}11–0{\cdot}16$; dorsal sensilla *t*–1 claviform, $BS = 0{\cdot}42–0{\cdot}44$; *t*–2 thin and *t*–3 small; exterior sensilla *a* slightly broadened and long, apex almost reaching the base of α 4; *b* also a little broadened and long, its apex reaching the base of γ 4; *c* situated close to *d* and subequal to *d* in length; *c* and *d* shorter than *b*; *e* and *f* close together; apices of *f* and *g* slightly surpass the tarsus. Interior sensilla *a'* slightly distal to *t*–1 and broadened, *b'* thin and situated in a row with *t*–2; *c'* thin.

Abdominal chaetotaxy (Table 3) peculiar by the reduction of tergal anterior setae: *A* 1 on abdominal terg. II–VI absent as in *Silvestridia*; on terg. VII only a single pair of anterior setae, *A* 5, present; terg. VIII with two pairs of anterior setae, *A* 3 and 5. Abdominal appendages II–III have two setae each, the apical one being less than half the subapical. Striate



Figs 11, 12. *Gracilentulus greensladei*. Foretarsus, (11) interior and (12) exterior views.



FIGS 13–21. *Gracilentulus greensladei*. 13, maxillary palpus; 14, labial palpus; 15, pseudoculus; 16, canal of maxillary gland; 17, dorsal chaetotaxy of abd. VI–VIII; 18, striae on the band of abd. VIII; 19, comb on terg. VIII; 20, abdominal appendage II; 21, female squama genitalis.

band on abdomen VIII reduced to some degree; striae distinct in the anterior part of the band, but not visible in the posterior part; comb on terg. VIII consisting of about 10 small teeth; female squama genitalis with long and pointed acrostylus.

Maturus junior. Foretarsus 47–48 μm. Important characters such as foretarsal sensillae, comb on abdominal terg. VIII, etc. as in adult.

Larva II. Foretarsus 42–43 μm. Foretarsal sensilla *b'* not found in the three specimens examined; striae in band on abdomen VIII fainter than those of the adult.

Larva I. Foretarsus 37 μm. Position and shape of foretarsal sensillae, the striate band on abdomen VIII, etc. as in the larva II.

Holotype ♂, Solomon Islands: Guadalcanal, Kukum, 15.xii.1964 (*P. J. M. & P. Greenslade*) (BMNH).

Paratypes. Solomon Islands: Santa Isabel, Buala, 14.xii.1964 (*P. J. M. & P. Greenslade*), 4 ♀ (BMNH); S.I., Tatamba, 27.ix.1965 (*P. N. Lawrence*), 1 ♀ (BMNH); Nggela, Vatilau, 14.vi.1965, 1 ♀; N., Soso, 2.xi.1965, 1 ♀ (all *P. J. M. & P. Greenslade*) (all BMNH); Guadalcanal, Kukum, 15.xii.1964, 16 ♀, 2 m.j., 3 l II; G., Kukum, vi.–vii.1966, 6 ♀ (all *P. J. M. & P. Greenslade*) (all BMNH); G., Lunga, viii.1966 (*P. J. M. & P. Greenslade*), 46 ♀, 1 m.j., 1 l I (BMNH). Bismarck Archipelago: Duke of York, Manuan, 21.vii.1962 (*Noona Dan Expedition*) 1 ♀ (UZM).

This new species is named in honour of Dr P. J. M. and Mrs P. Greenslade, who made such a rich proturan collection in the Solomon Islands.

G. greensladei is peculiar, among all known forms of this genus, in the position of foretarsal sensillae *c*, *d*, *e*, and *f*, as well as in the size of *a* and *b*.

Key to the known species of *GRACILENTULUS*

1 Canal of maxillary gland with long proximal part with two or three oval dilatations along the very narrow tube 2
– Canal of maxillary gland with short proximal part with end dilatation . . . 6
2 Sensilla *b* shorter than half of *a* 3
– Sensilla *b* longer than *a* 5
3 Sensilla *b* extremely short and thin, only reaching *γ* 2; *b'* and *t*–2 in a line . . 4
– Sensilla *b* almost reaching base of *γ* 3 and surpassing *t*–2; *b'* midway between *t*–2 and *α* 4; *a* surpassing *t*–2; terg. I–VI with six anterior setae . ***japonicus*** (Imadaté, 1961)
4 Sensilla *a* only just reaching *c*; terg. V–VI with only four anterior setae ***malaysiensis*** Imadaté, 1964
– Sensilla *a* reaching *t*–2; terg.V–VI with six anterior setae (or eight) ***kenyanus*** (Condé, 1948)
5 Sensilla *b* very long, almost reaching *g*; *a* reaching *γ* 3; smaller, foretarsus about 50 μm . . . . . ***ohyamai*** Imadaté, 1964
– Sensilla *b* shorter, hardly reaching *e*; *a* reaching *γ* 2; bigger, foretarsus about 75 μm ***sanjianus*** Imadaté, 1964
6 Sternite VIII with two posterior setae 7
– Sternite VIII with only the four anterior setae 8
7 Canal of maxillary gland long, as long as proximal branch of fulcrum; *b'* present; terg.VII with eight anterior setae . . . . . ***tasmanicus*** Tuxen, 1967
– Canal of maxillary gland short, half the proximal branch of fulcrum; *b'* absent; in terg.VII *A* 1 is missing . . . . . ***similis*** Tuxen, 1967
8 Sensilla *b'* missing; *b* as long as *c* and *d*; comb VIII with short teeth ***floridanus*** (Ewing, 1924)

TABLE 3

Chaetotaxy of *Gracilentulus greensladei*

	Larva I		Larva II		Mat. jun.		Adult	
	Form.	Prim. setae	Form.	Sec. setae	Form.	Tert. set.	Form.	Compl. setae
(Dorsal)								
Th.I	4	1, 2	4		4		4	
II—III	4 / 8	*A* 2, *M* *P* 1,2,3,5 (4?)	6 / 14(12)	*A* 4 *P* 1*a*, (2*a*),4	6 / 14		6 / 14	
Abd.I	0 / 8	*P* 1,2,3,5	0 / 10	*P* 2*a*	6 / 10	*A* 1,2,5	6 / 12	*P* 1*a*
II–III	0 / 10	*P* 1,2,3,4,5	0 / 12(14)	*P* 2*a*,(4*a*)	4 / 14	*A* 2,5	4 / 16	*P* 1*a*
IV–VI	0 / 10	*P* 1,2,3,4,5	0 / 14(12)	*P* 2*a*, (4*a*)	4 / 14	*A* 2,5	4 / 16	*P* 1*a*
VII	0 / 10	*P* 1,2,3,4,5	0 / 14	*P* 2*a*,4*a*	2 / 16	*A* 5 *P* 3*a*	2 / 18	*P* 1*a*
VIII	0–6 / 6	*M* 2,3,4 *P* 1,2,4	2–6 / 8	*A* 3 *P* 3	4–7 / 8	*A* 5, *M c*	4–7 / 8	
IX			8	1,3,4,5	10	2	12	3*a*
X					8	1,3,4,5	12(10)	2,(3*a*)
XI					6		6	
Telson	9		9		9		9	
(Ventral)								
Th.I	?		2–2 / 4	*A* 1, *M* 1 *P* 1, 2	4–2 / 6	*A* 2 *P* 3	4–2 / 6	
II–III	?		5–2 / 2	*A c*,2,3, *M* *P* 1	5–2 / 4	*P* 2	7(5)–2 / 4	(*A* 4)
Abd.I	0 / 2	*P* 1	3 / 2	*A c*, 2	3 / 2		3 / 4	*P* 2
II–III	0 / 3	*P c*, 3	1(0) / 5(3)	*A c* *P* 2	3 / 5	*A* 2	3 / 5	
IV–VII	1 / 4	*A c* *P* 2,3	1 / 6	*P* 1	3 / 8	*A* 2 *P* 1*a*	3 / 8	
VIII	2 / 0	2	4 / 0	1	4 / 0		4 / 0	
IX			4		4		4	
X					4		4	
XI					0(2)	(2)	6(4)	1,3
Telson	8		8		6		6	

– Sensilla *b'* present; *b* shorter or longer than *c* 9
9 Sensilla *b* longer than *c*, reaching *t*–3; *b*–*c*–*d* in a line; *f* close to *e*; terg.II–VI with four anterior setae, terg.VII with only two (*A* 5) . . . ***greensladei*** sp. n (p. 340)
– Sensilla *b* shorter than *c*; *d* distal to *b*–*c*; terg.II–VI with six anterior setae . . 10
10 Sensilla *f* close to *e* . . . . . ***sachikoae*** Imadaté, 1964
– Sensilla *f* midway between *e* and *g* 11
11 Sensilla *b* short, just surpassing base of *d* . . . . ***meridianus*** (Condé, 1945)
– Sensilla *b* longer, reaching base of *e* . . . . . ***gracilis*** (Berlese, 1908)

PROTENTOMIDAE

Twelve protentomid specimens belonging to a single species of the genus *Condeellum* are present. It is interesting to note that they were all collected from Mt Austen (330 m) on Guadalcanal Island.

Condeellum crucis sp. n.

(Text-figs 22–35)

Body length 790–820 μm in well expanded adults.

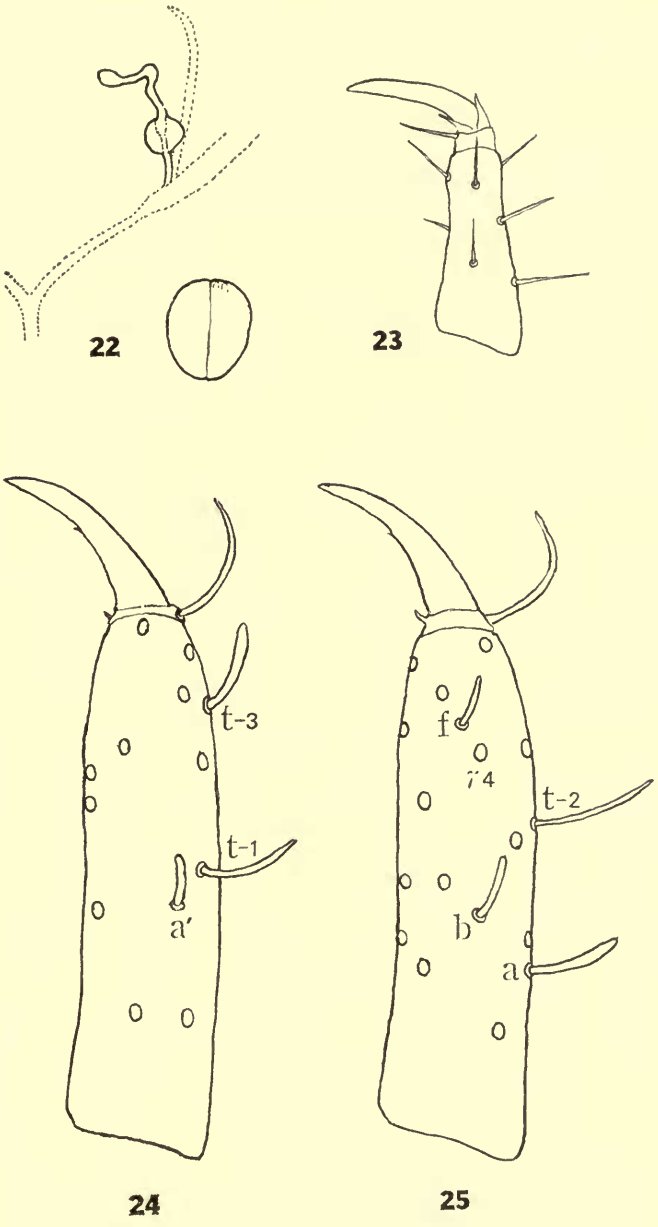
Mouthparts rather broad; mandible not pointed, but has a blunt end with possibly a few minute teeth; maxillary and labial palpi ornamented with a tuft of setae apically; lobus internus of maxilla rather broad and lobus externus pointed distally; labium with five setae: three relatively long and situated along the outer margin, one short seta placed near to inner margin and a little distal to the palpus, and one short seta at the tip, as in all other members of this genus. Pseudoculus oval, *PR* = 9–10; canal of the maxillary gland of the normal shape for the genus, proximal part sharply bent at about halfway between the heart-shaped dilatation and the end.

Foretarsus 36–44 μm in length, claw with an inner tooth, *TR* = 2·7–2·9; empodium short, *EU* = 0·1; position and shape of foretarsal sensillae similar to that of other members of the genus. Dorsal sensilla *t*–1 not broadened, *BS* = 1·0; *t*–2 a little thinner than *t*–1 and pointed apically; *t*–3 broad; exterior sensilla *a* subequal to *t*–3 in shape and length; *b* and *f* slightly broadened, but smaller than *a*; *f* placed a little ventrally and distally to *γ* 4; *c*, *d*, *e* and *g* absent; interior sensilla *a'* proximal to *t*–1, short and slightly broad; *b'* and *c'* absent. Middle and hind tarsi have long empodia and tunica-lobes; middle tarsus 18–21 μm, and its claw 10–13 μm; hind tarsus 19–22 μm and its claw 11–14 μm.

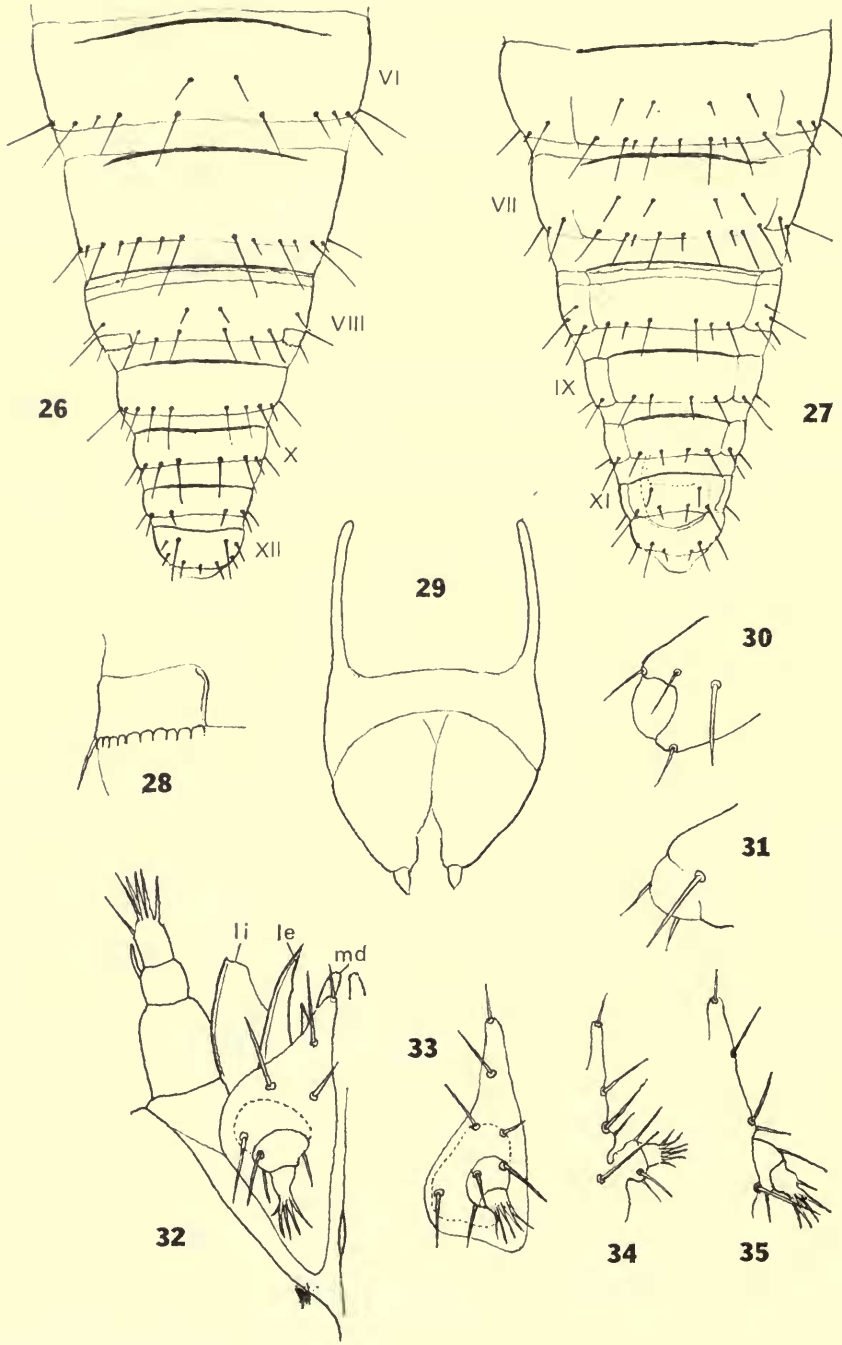
Thorax I with two pairs of dorsal setae, pair 1*a* absent. Thorax II–III with dorsal *P* 5 rudimentary. Abdominal terg. I–VI with only a single pair of anterior setae, *A* 1, terg. VII no anterior setae. Stern. II–VII with a central seta, *P c*, present in the posterior row. Abdominal appendages I–II two-segmented with four setae; III rudimentary with two short apical and one long subapical seta. Comb on abdomen VIII consists of about 10 small teeth; female squama genitalis with pointed acrostylus.

Chaetotaxy as in Table 4.

Maturus junior. Foretarsus 33–35 μm. Important characters such as foretarsal sensillae, canal of the maxillary gland, etc., as in the adult. In comparison with the chaetotaxy of the adult, setae 2 on abd. terg. X, setae 1 and 3 on stern. XI, are absent.



FIGS 22–25. *Condeellum crucis*. 22, pseudoculus and canal of maxillary gland; 23, hindtarsus; 24, 25, foretarsus, (24) interior and (25) exterior views.



FIGS 26–35. *Condeellum crucis*. 26, 27, chaetotaxy of abd. VI–XII, (26) dorsal and (27) ventral views; 28, comb of terg. VIII; 29, female squama genitalis; 30, abdominal appendage II; 31, abdominal appendage III; 32, mouthparts, ventral view; 33–35, labium in lateral view of (33) *C. ishiianum*, (34) *C. matobai* and (35) *C. regale*.

Holotype ♀, SOLOMON ISLANDS: Guadalcanal, Mt Austen, 330 m, 11.ii.1966 (BMNH).

Paratypes. Same data as holotype, 6 ♀, 1 m.j.; 28.iii.1966, 1 ♀; 7–10.vi.1966, 1 ♀; 10.viii.1966, 2 ♀ 2 m.j. (all *P. J. M. & P. Greenslade*) (all BMNH).

The species name is derived from the Latin word 'crux' in reference to the Southern Cross, the famous constellation of the southern hemisphere.

This new species is peculiar among *Condeellum* in the absence of anterior setae on abdominal terg. VII. All known species of this genus may be separated by the chaetotaxy of the abdominal terg. II–VII, as given in the following key.

TABLE 4

Chaetotaxy of *Condeellum crucis*

	Formula	Composition of setae
(Dorsal)		
Th.I	4	1,2
II–III	6	*A* 2,4, *M*
	12	*P* 1,1*a*,2,2*a*,3,4
Abd.I	2	*A* 1
	14	*P* 1,1*a*,2,2*a*,3,4,5
II–VI	2	*A* 1
	14	*P* 1,2,2*a*,3,4,4*a*,5
VII	0	
	18	*P* 1,1*a*,2,2*a*,3,3*a*,4,4*a*,5
VIII	6–6	*A* 1,3,5, *M* 2,3,4
	8	*P* 1,2,3,4
IX	12	1,2,3,3*a*,4,5
X	10	1,2,3,4,5
XI	6	
Telson	9	

	Formula	Composition of setae
(Ventral)		
Th.I	2–4	*A M* 1,2
	6	*P* 1,2,3
II	4–2	*A* 1,2, *M*
	4	*P* 1, 2
III	6–2	*A* 1,2,3, *M*
	4	*P* 1, 2
Abd.I	4	*A* 2,3
	2	*P* 1
II–III	4	*A* 2,3
	5(3)	*P c*, (2),3
IV–VI	4	*A* 2,3
	7(9)	*P c*,1, (1*a*), 2,3
VII	4	*A* 2,3
	9	*P c*,1,1*a*,2,3
VIII	6	1,1*a*,2
IX–X	4	
XI	6	1,2,3
Telson	6	

KEY TO THE KNOWN SPECIES OF *CONDEELLUM*

1 Abdominal terg. II–VI with a single pair of anterior setae, *A* 1 2
– Abdominal terg. II–VI with two or three pairs of anterior setae (including a pleural pair, *A* 5) 3
2 Terg. VII with two pairs of anterior setae, *A* 1 and 5; foretarsus 46 μm (Japan)
matobai Imadaté, 1973

– Terg. VII without anterior setae; foretarsus 36–44 μm (Solomon Is.) ***crucis*** sp.n. (p. 346)

3 Terg. II–VI with three pairs of anterior setae, *A* 1, 2 and 5; terg. VII with *A* 4 and 5; foretarsus 42–54 μm (Thailand, Borneo) . . . ***ishiianum*** Imadaté, 1965

– Terg. II–VI with two pairs of anterior setae *A* 1 and 5; terg. VII with *A* 4 (as in Condé, 1958) and 5; foretarsus 50–55 μm (Réunion, Nepal and Thailand) ***regale*** (Condé, 1958)

EOSENTOMIDAE

There are 315 specimens from more than 35 different localities in the present collection. Six of these are indeterminable, owing to their condition; the 309 remaining specimens have been placed in eight species as follows: *Eosentomon oceaniae* sp. n., *E. melanesiense* sp. n., *E. solare* sp. n., *E. sakura* Imadaté & Yosii, *E. solomonense* sp. n., *E. guadalcanalense* sp. n., *E. notiale* sp. n., *E. noonadanae* sp. n.

The first species, *oceaniae*, belongs to the '*swani*-group' (Tuxen, 1964 : 132) which has been recorded from East Asia, Australia and South America, and the next five to the '*kumei*-group' (loc. cit.: 139), found in both the tropical and temperate areas of East Asia (Imadaté, 1965). The seventh species, *notiale*, is regarded as a member of the '*saharense*-group' on account of the long empodium of the hind leg (Tuxen 1964 : 145), although as in *E. udagawai* Imadaté it may be more natural to arrange it into the '*kumei*-group' on the structure of the female squama genitalis. The last species, *noonadanae*, is peculiar among all known forms of eosentomids, not only in the structure of the female squama genitalis, but also in the chaetotaxy.

Eosentomon oceaniae sp. n.

(Text-figs 36–40)

[*Eosentomon tankoktongi* Imadaté sensu Tuxen, 1967 : 6. Misidentification.]

Body length usually 1000–1200 μm in expanded adults.

Mouthparts normal; labral setae present; clypeal apodeme distinct; pseudoculus rather small, *PR* = 12–13.

Foretarsus usually 94–104 μm in length, *TR* = 5·2–5·4 and *EU* = 1·0, dorsal sensilla *t*–1 placed at about halfway between α 3 and α 3′, *BS* = 1·2–1·3; *t*–2 thin; apex of *t*–3 almost reaching base of α 7; exterior sensilla *a* relatively long, apex reaching level of α 3; *b* and *c* normal; *d* situated a little proximal to *y*; spatulate *e* and *g* present; *f*–1 seta-like and *f*–2 short; interior sensilla *a′* stout; *b′*–1 placed about level with α 3′; *b′*–2 normal and *c′* slightly thickened. Hind tarsal empodium short and less than one-fifth the claw length.

Thoracic chaetotaxy normal. On abdominal terg. IV–VI, *A* 1, 2 and 3 absent; *A* 4 often missing on terg. VI or V and VI; on terg. VII *A* 1, 2, 3 and 4 lacking. Tergal accessory setae *P* 1*a* on terg. VI–VII short, not filiform, less than one-fifth of *P* 1 and situated in the same row as *P* 1 and 2. *P* 2 and 1″ on terg. VIII not displaced.

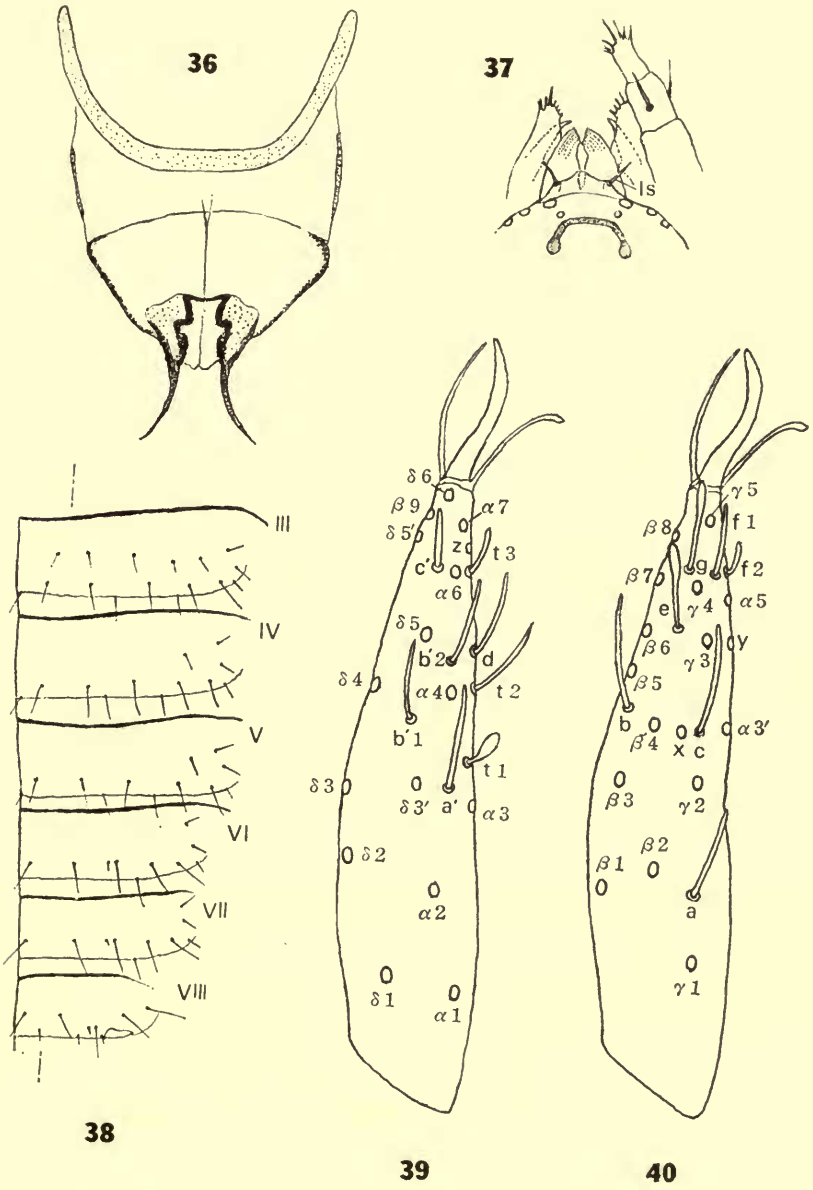
Female squama genitalis resembles that of *E. swani* Womersley and its allies; caput processus bent against the median edge of stylus in a sharp angle, lateral sclerotization present.

Maturus junior. Foretarsus 80–88 μm. Important characters such as foretarsal sensillae, chaetotaxy, etc. as in the adult with the exception of the absence of setae 2 and 4 on abdominal stern. XI.

Larva II. Foretarsus 68–74 μm. Clypeal apodeme indistinct, position and shape of the foretarsal sensillae are not different from those of the adult.

Larva I. Foretarsus 72 μm in the specimen from Betimatu, Guadalcanal Island. Clypeal apodeme indistinct; position and shape of the foretarsal sensillae similar to those of larva II and adult.

Chaetotaxy as in Table 5.



FIGS 36–40. *Eosentomon oceaniae.* 36, female squama genitalis; 37, mouthparts, dorsal view (ls = labral setae); 38, tergal chaetotaxy of abd. III–VIII; 39, 40, foretarsus, (39) interior and (40) exterior views.

Holotype ♀, Solomon Islands: Guadalcanal, Mt Austen, 11.ii.1966 (*P. J. M. & P. Greenslade*) (BMNH).

Paratypes. Bismarck Archipelago: Mussau, Boliu, 4.vi.1962, 1 ♀; Lavongai, Banatam, 20.iii.1962, 1 m.j.; 26.iii.1962, 1 ♂; Dyaul, Sumuna, 7.iii.1962, 1 ♂, 3 ♀; D., Kollepine, 12.iii.1962, 1 ♀; New Ireland, Lemkamin, 23.iv.1962, 1 ♂, 1 ♀, 3 l II; Duke of York, Manuan, 21.vii.1962, 1 ♂, 2 ♀, 1 l II; New Britain, Valoka, 13.vii.1962, 1 ♂, 10 ♀, 3 m.j., 2 l II, 1 l I (all *Noona Dan Expedition*) (all UZM). Solomon Islands: Choiseul, Katurasele, 23.xii.1965 (*P. J. M. & P. Greenslade*), 1 ♂; Kolombangara, north of Kuzi, 6.ix.1965 (*P. N. Lawrence*), 1 ♂; Santa Isabel, Buala, 14.xii.1964, 4 ♂, 1 l II; 12.ii.1965, 1 ♂ (all *P. J. M. & P. Greenslade*); Russell, Yandina, 15.viii.1966, 1 ♂; R., not localized, 18.iii.1965 (*P. J. M. & P. Greenslade*), 1 m.j.; Nggela, Vatilau, 14.vi.1965 (*P. J. M. & P. Greenslade*), 1 ♂, 1 ♀, 1 m.j.; Savo, One Naika, 1.vi.1965 (*P. J. M. & P. Greenslade*), 2 ♂, 4 ♀, 1 l II; Guadalcanal, Mt Austen, 13.xi.1964, 1 ♂, 2 ♀; 24.x.1964, 1 ♀; 11.ii.1966, 9 ♂, 5 ♀, 2 m.j., 1 l II; 10.viii.1966, 1 ♂, 5 ♀, 2 m.j. (all *P. J. M. & P. Greenslade*); G., Mt Popamanase, 2100 m, 26.vi.1965 (*P. J. M. & P. Greenslade*), 1 m.j.; G., Betimatu, 30.iv.1965 (*P. J. M. & P. Greenslade*), 1 l I (all BMNH); G., Honiara, 4.viii.1962 (*Noona Dan Expedition*), 1 ♀ (UZM); G., Lunga, viii. 1966 (*P. J. M. & P. Greenslade*), 4 ♂; Malaita, Dala, 16.ii.1965 (*P. J. M. & P. Greenslade*), 1 ♂; Bellona, 28.v.1965 (*P. J. M. & P. Greenslade*), 1 ♂, 1 m.j.; Rennell, Kagaba Bay, 6.iv.1965 (*P. J. M. & P. Greenslade*), 1 ♀ (all BMNH); R., Niupani, 18.viii.1962, 3 ♂, 2 ♀; 19.viii.1962, 1 ♂ (all *Noona Dan Expedition*) (all UZM).

Further distribution. Australia (Tuxen, 1967, as *tankoktongi* Imadaté).

It is likely that this form is the commonest eosentomid in Melanesia. *E. oceaniae* is similar to *E. tankoktongi* Imadaté from Borneo. The important characters such as the position and shape of the foretarsal sensillae and of the tergal accessory setae *P* 1*a* on abdominal terg. VI–VII are almost the same in both, but the tergal setae *A* 1, 2, and 3 on abdominal terg. IV are always absent in the Melanesian specimens examined as well as in the Australian specimen examined by Tuxen (1967). The above difference in chaetotaxy seems to be significant and it is reasonable to regard the Melanesian and Australian form as different from *E. tankoktongi*.

Eosentomon melanesiense sp. n.

(Text-figs 41–46)

Body length is usually 700–900 μm in expanded adults.

Mouthparts normal; labral setae present; clypeal apodeme distinct; pseudoculus rather small, *PR* = 11–13.

Foretarsus 73–77 μm in length, *TR* = 4·7–5·1 and *EU* = 1·0; position and shape of foretarsal sensillae similar to those of *E. oceaniae*. Dorsal sensilla *t*–1 situated at about halfway between α 3 and α 3′, *BS* = 1·2; apex of exterior sensilla *a* slightly surpassing level of α 3; spatulate *e* and *g* normal; interior sensilla *b*′–1 present; empodium of hind tarsus short and less than one-fifth claw length.

Thoracic chaetotaxy normal. On abdominal terg. IV–VI *A* 1, 2 and 3 absent and *A* 4 often also missing; on terg. VII *A* 1, 2, 3 and 4 absent and *P* 1*a* short, not filiform, less than one-fifth

TABLE 5

Chaetotaxy of *Eosentomon oceaniae*

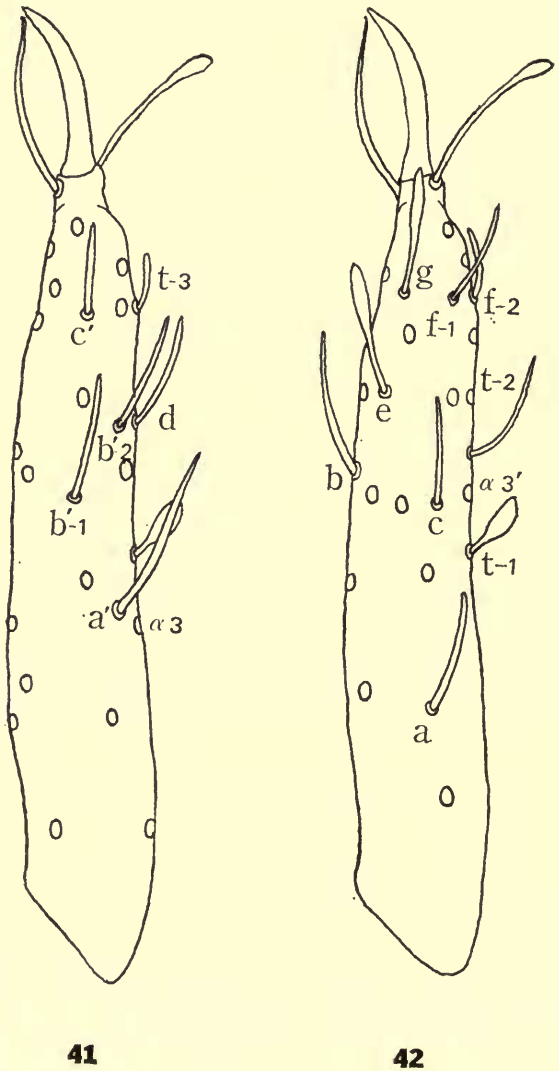
	Larva I		Larva II		Mat. jun.		Adult	
	Form.	Prim. setae	Form.	Sec. setae	Form.	Tert. setae	Form.	Compl. setae
(Dorsal)								
Th.I	2	1	4	2	4		4	
II	4	*A* 2, *M*	6	*A* 4	6		6	
	12	*P* 1,1*a*,2,3,4,5	14	*P* 2*a*	16	*P* 3*a*	16	
III	4	*A* 2, *M*	6	*A* 4	6		6	
	10	*P* 1,1*a*,2,3,4	12	*P* 2*a*	16	*P* 3*a*,5	16	
Abd.I	0		0		4	*A* 1, 2	4	
	6?	*P* 1,1*a*,2	8?	*P* 3?	10	*P* 4	10	
II	0		2	*A* 5	10	*A* 1,2,3,4	10	
	12	*P* 1,1*a*,2,3,4,5	16	*P* 2*a*,4*a*	16		16	
III	0		4	*A* 4,5	10	*A* 1,2,3	10	
	12	*P* 1,1*a*,2,3,4,5	16	*P* 2*a*,4*a*	16		16	
IV	0		4	*A* 4,5	4		4	
	12	*P* 1,1*a*,2,3,4,5	16	*P* 2*a*,4*a*	16		16	
V–VI	0		4(2)	*A* 5, (4)	4(2)		4(2)	
	12	*P* 1,1*a*,2,3,4,5	16	*P* 2*a*,4*a*	16		16	
VII	0		2	*A* 5	2		2	
	12	*P* 1,1*a*,2,3,4,5	16	*P* 2*a*,4*a*	16		16	
VIII	6	*A* 1,2,3	6		6		6	
	7	*P c*,1′,2,2′	9	*P* 1″	9		9	
IX			8		8		8	
X–XI					8		8	
Telson	9		9		9		9	
(Ventral)								
Th.I–II	4–2	*A* 1,2, *M*	6–2	*A* 3	6–2		6–2	
	2	*P* 2	6	*P* 1, 3	6		6	
III	4–2	*A* 1,2, *M* 1	6–2	*A* 3	6–4	*M* 2	6–4	
	2	*P* 2	6	*P* 1,3	8	*P* 2*a*	8	
Abd.I	4	*A* 1,2	4		4		4	
	2	*P* 1	4	*P* 2	4		4	
II–III	2	*A* 1	4	*A* 2	6	*A* 3	6	
	4	*P* 1,2	4		4		4	
IV–VII	2	*A* 1	4	*A* 2	6	*A* 3	6	
	6	*P* 1,2,3	8	*P* 2*a*	10	*P* 2*a*′	10	
VIII	0		0		0		0	
	5	*P c*, 1, 2	7	*P* 1*a*	7		7	
IX			4	1,2	4		4	
X					4	1,2	4	
XI					4	1,3	8	2,4
Telson	12		12		12		12	

of *P* 1 and situated in the same row as *P* 1 and 2; *P* 2 and 1″ on terg. VIII not displaced; setae 1, 2 and 3 on terg. X and setae 1 and 2 on terg. XI absent.

Female squama genitalis characterized by the distinctive S-like shape of the combined caput and corpus processus in the processus sternalis.

Maturus junior. Foretarsus 63–72 μm. Important characters such as foretarsal sensillae, chaetotaxy, etc. not different from those of adult except for absence of setae 2 and 4 on abdominal stern. XI.

Larva II. Foretarsus 51–66 μm; position and shape of foretarsal sensillae similar to those



FIGS 41, 42. *Eosentomon melanesiense.* Foretarsus, (41) interior and (42) exterior views.

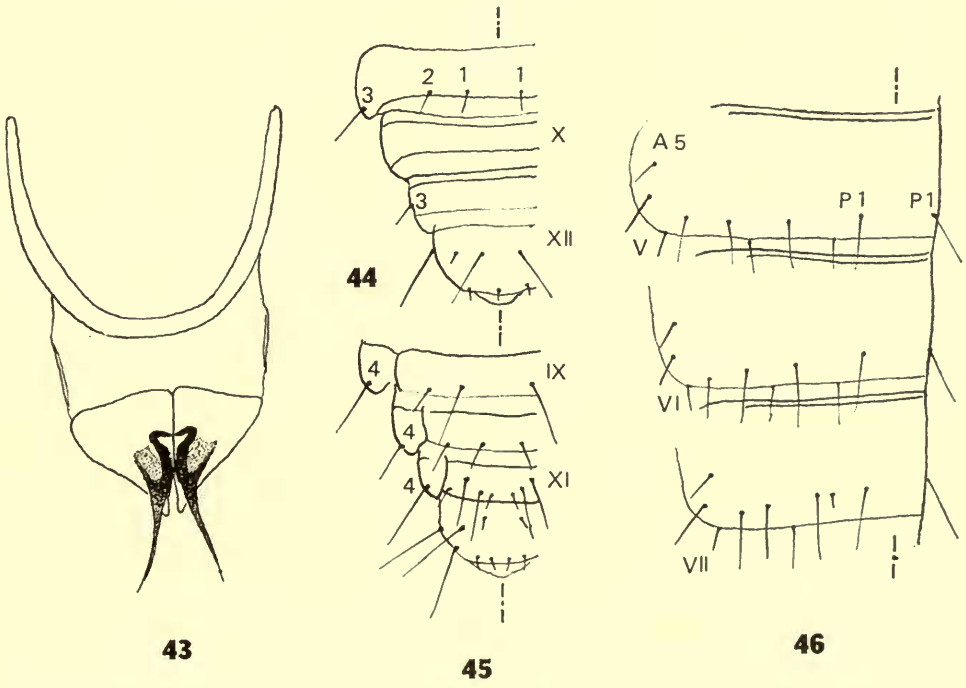
of *maturus junior*. Except for shape and position of *P* 1a on abdominal terg. VI, chaetotaxy not different from that of same stage of *E. oceaniae*.

Larva I. Foretarsus 45–52 μm. Except for shape and position of *P* 1*a* on abdominal terg. VI, chaetotaxy as in same stage of *E. oceaniae*.

Chaetotaxy as in Table 6.

Holotype ♂, SOLOMON ISLANDS: Guadalcanal, Mt Austen, 11.ii.1966 (*P. J. M. & P. Greenslade*) (BMNH).

Paratypes. BISMARCK ARCHIPELAGO: Mussau, Malakata, 11.vi.1962 (*Noona Dan Expedition*) 1 ♀; Lavongai, Banatam, 20.iii.1962, 3 ♂, 5 ♀, 2 m.j.; 23.iii.1962, 2 ♂ 1 ♀, 1 m.j.; 26.iii.1962, 7 ♂, 10 ♀, 1 l I (all *Noona Dan Expedition*); New Britain, Valoka, 13.vii.1962 (*Noona Dan Expedition*), 1 l II (all UZM). SOLOMON ISLANDS: Wagina, 25.v.1966 (*P. J. M. & P. Greenslade*), 1 ♂, 1 ♀; Kolombangara, north of Kuzi, 6.ix.1965 (*P. N. Lawrence*), 1 ♀; Santa Isabel, Buala, 14.xii.1964 (*P. J. M. & P. Greenslade*), 1 ♂, 1 ♀, 1 l II; Savo, Koela, 1.vi.1965 (*P. J. M. & P. Greenslade*), 1 ♀; Guadalcanal, Mt Austen, 24.viii.1965 (*P. N. Lawrence*), 1 ♀; 24.v.1965, 1 ♂, 3 ♀, 1 m.j.; 11.ii.1966, 13 ♂, 18 ♀, 3 m.j.; 10.viii.1966, 7 ♂, 18 ♀, 2 l I (all *P. J. M. & P. Greenslade*); G., Mt Jonapau, 1100 m, 6.v.1965 (*P. J. M. & P. Greenslade*), 1 ♀; G., Mt Popamanaseu, 1500 m, x.1965 (*P. J. M. & P. Greenslade*), 1 ♀; G., Berande Point, 30.iv.1965 (*P. J. M. & P. Greenslade*), 1 ♂; G., Lunga, viii. 1966 (*P. J. M. & P. Greenslade*), 3 ♀, 1 m.j., 1 l I (all BMNH).



FIGS 43–46. *Eosentomon melanesiense*. 43, female squama genitalis; 44, 45, chaetotaxy of abd. IX–XII, (44) dorsal and (45) ventral views; 46, tergal chaetotaxy of abd. V–VII.

TABLE 6

Chaetotaxy of *Eosentomon melanesiense*

	Formula	Composition of setae		Formula	Composition of setae
(Dorsal)			(Ventral)		
Th.I	4	1,2	Th.I–II	6–2	*A* 1,2,3, *M*
II–III	6	*A* 2,4, *M*		6	*P* 1,2,3
	16	1,1*a*,2,2*a*,3,3*a*,4,5	III	6–8	*A* 1,2,3, *M* 1,2
Abd.I	4	*A* 1, 2		8	*P* 1,2,2*a*,3
	10	*P* 1, 1*a*, 2,3,4	Abd.I	4	*A* 1,2
II–III	10	*A* 1,2,3,4,5		4	*P* 1,2
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	II–III	6	*A* 1,2,3
IV–VI	2(4)	*A* 5, (4)		4	*P* 1,2
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	IV–VII	6	*A* 1,2,3
VII	2	*A* 5		10	*P* 1,2,2*a*,2*a*′,3
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	VIII	0	
VIII	6			7	*P c*, 1, 1*a*, 2
	9		IX–X	4	
IX	8	1,2,3,4	XI	8	
X	2	4	Telson	12	
XI	4	3,4			
Telson	9				

The present new species and the following species, *E. solare*, are closely similar to *E. dawsoni* Condé from New Zealand and *E. wygodzinskyi* Bonet from Brazil in important characters such as the peculiar pattern of the chaetotaxy on abdomen X–XI as well as the shape and position of foretarsal sensillae. *E. melanesiense* is distinguishable by the absence of *A* 1, 2 and 3 on abdominal terg. IV and by the shape of the female squama genitalis (from *E. dawsoni*). Significant difference of body size is also denotable between this species and *E. dawsoni*.

Eosentomon solare sp. n.

(Text-figs 47–50)

Body length usually 700–900 μm in expanded adults.

Mouthparts normal; clypeal apodeme distinct; labral setae present; pseudoculus of medium size, *PR* = 10–11.

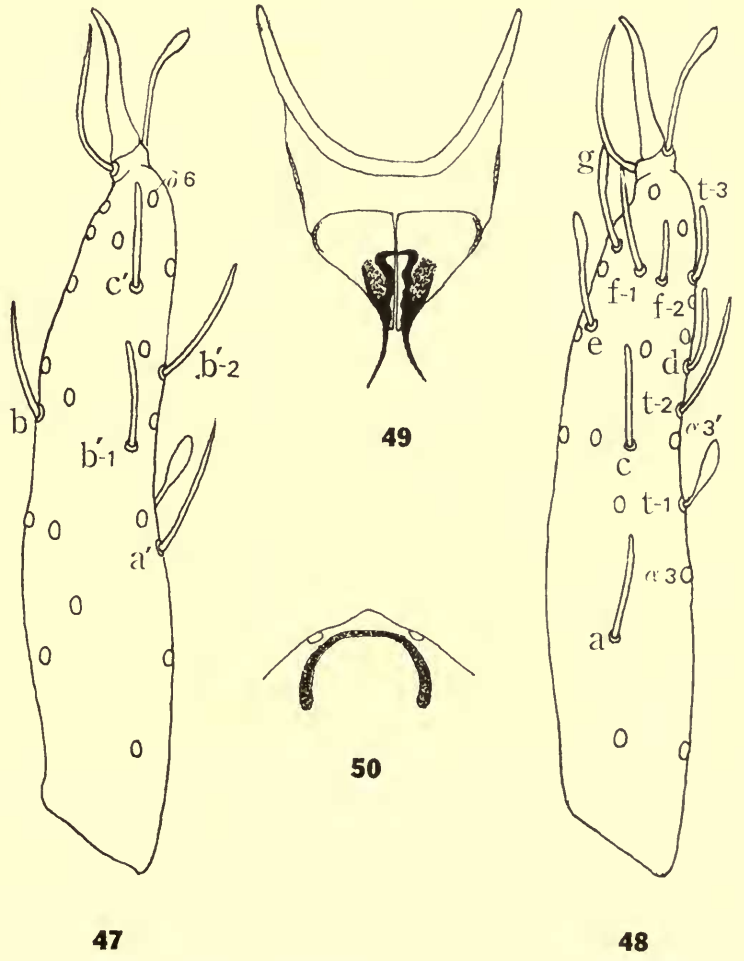
The foretarsus is 70–76 μm in length, *TR* = 4·8–5·1 and *EU* = 1·0; position and shape of foretarsal sensillae similar to those in *E. melanesiense*; dorsal sensilla *t*–1 situated about halfway between α 3 and α 3′, *BS* = 1·1–1·2; apex of exterior sensilla *a* clearly surpasses level of α 3; spatulate sensillae *e* and *g* normal; interior sensilla *b*′–1 present. Empodium of hind tarsus short and less than one-fifth claw length.

Thoracic chaetotaxy normal. Abdominal chaetotaxy similar to that of *E. wygodzinskyi* Bonet and *E. dawsoni* Condé. On abdominal terg. II–IV five pairs of anterior setae (*A* 1, 2, 3, 4 and 5) present, but *A* 1, 2 and 3 on terg. V–VI absent; on terg. VII *A* 1, 2, 3 and 4 missing and *P* 1*a* short, not filiform, less than one-fifth of *P* 1 and situated in the same row as *P* 1 and 2; *P* 2 and 1″ on terg. VIII not displaced; setae 1, 2, and 3 on terg. X and setae 1, 2 on terg. XI absent. Female squama genitalis similar to that of *E. melanesiense*, but with latero-proximal sclerotization.

Maturus junior. Foretarsus 59–62 μm; except for absence of setae 2 and 4 on abdominal stern. XI, important features such as foretarsal sensillae, chaetotaxy, etc., do not differ from those of adult.

Larva II. Foretarsus 52–53 μm; position and shape of foretarsal sensillae as in maturus junior.

Chaetotaxy as in Table 7.



FIGS 47–50. *Eosentomon solare.* 47, 48, foretarsus, (47) interior and (48) exterior views; 49, female squama genitalis; 50, clypeal apodeme.

Holotype ♀, Solomon Islands: Choiseul, Katurasele, 23.xii.1965 (*P. J. M. & P. Greenslade*) (BMNH).

Paratypes. Bismarck Archipelago: Dyaul, Sumuna, 11.iii.1962 (*Noona Dan Expedition*), 1 ♂, 1 l II; D., Kollepine, 12.iii.1962 (*Noona Dan Expedition*), 2 ♀, 1 l II; Duke of York, Manuan, 21.vii.1962 (*Noona Dan Expedition*), 4 ♂, 5 ♀, 1 l II (all UZM). Solomon Islands: Choiseul, Katurasele, 23.xii.1965 (*P. J. M. & P. Greenslade*), 2 ♀; Russell, Yandina, 15.viii.1966 (*P. J. M. & P. Greenslade*), 1 ♀; Nggela, Soso, 2.xii.1965 (*P. J. M. & P. Greenslade*), 2 ♂, 2 ♀; Guadalcanal, Lunga, viii. 1966 (*P. J. M. & P. Greenslade*), 1 ♂, 5 ♀, 2 m.j.; Bellona, 28.v.1965 (*P. J. M. & P. Greenslade*), 1 ♀; Rennell, Kagaba Bay, 6.iv.1965 (*P. J. M. & P. Greenslade*), 1 ♀ (all BMNH).

Table 7

Chaetotaxy of *Eosentomon solare*

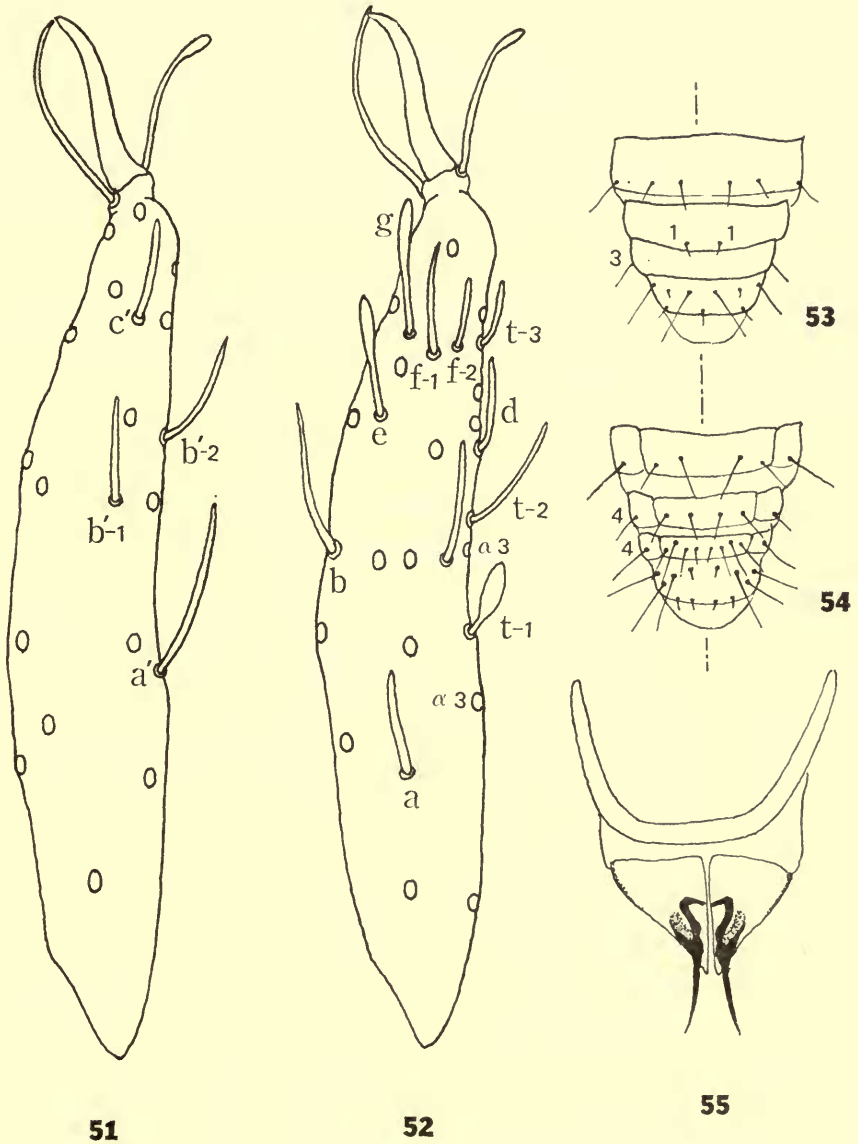
(Dorsal)	Formula	Composition of setae	(Ventral)	Formula	Composition of setae
Th.I	4	1,2	Th.I–II	6–2	*A* 1,2,3, *M*
II–III	6	*A* 2, 4, *M*		6	*P* 1,2,3
	16	*P* 1, 1*a*,2,2*a*,3,3*a*,4,5	III	6–4	*A* 1,2,3, *M* 1,2
Abd.I	4	*A* 1,2		8	*P* 1, 2, 2*a*,3
	10	*P* 1,1*a*,2,3,4	Abd.I	4	*A* 1,2
II–IV	10	*A* 1,2,3,4,5		4	*P* 1,2
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	II–III	6	*A* 1,2,3
V–VI	4	*A* 4,5		4	*P* 1,2
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	IV–VII	6	*A* 1,2,3
VII	2	*A* 5		10	*P* 1,2,2*a*,2*a*′,3
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	VIII	0	
VIII	6			7	*P c*,1,1*a*,2
	9		IX–X	4	1,2
IX	8	1,2,3,4	XI	8	
X	2	4	Telson	12	
XI	4	3,4			
Telson	9				

As mentioned in the description of the preceding species, the present species is very similar to *E. melanesiense*, *E. dawsoni* Condé and especially *E. wygodzinskyi* Bonet. From *E. melanesiense* it is distinguished by the presence of five pairs of anterior setae on abdominal terg. IV as well as by the presence of a latero-proximal sclerotization in the female squama genitalis. The shape of the caput processus of the female squama genitalis is different from that of *E. dawsoni*. The difference between *E. solare* and *E. wygodzinskyi*, such as the relative length of the filum processus of the female squama genitalis and of the foretarsal sensilla *c*′, may be significant, although these two forms closely resemble each other.

Eosentomon sakura Imadaté & Yosii

(Text-figs 51–55)

Eosentomon sakura Imadaté & Yosii, 1959 : 7, pl. 2, figs 8–10. Holotype ♀, JAPAN: Nara, Mt Yoshino, 30.vii.1954 (*G. Imadaté*) (KU).
Eosentomon sakura Imadaté & Yosii; Imadaté, 1974 : 261–268.



FIGS 51–55. *Eosentomon sakura*. 51, 52, foretarsus, (51) interior and (52) exterior views; 53, 54, chaetotaxy of abd. IX–XII, (53) dorsal and (54) ventral views; 55, female squama genitalis.

Specimens examined.

Bismarck Archipelago: New Britain, Valoka, 13.vii.1962 (*Noona Dan Expedition*), 1 ♀, 1 l II, 1 l I (UZM). Solomon Islands: Nggela, Vatilau, 14.vi.1965 (*P. J. M. & P. Greenslade*), 1 ♂; Savo, Koela, 1.vi.1965 (*P. J. M. & P. Greenslade*), 1 m.j.; Guadalcanal, Mt Austen, 11.ii.1966 (*P. J. M. & P. Greenslade*), 1 ♂, 1 ♀, 1 m.j. (all BMNH); G., Honiara, 4.viii.1962 (*Noona Dan Expedition*), 1 ♀, 1 m.j., 1 l II, 1 l I (UZM); San Christoval, Warahitor, 1.viii.1966 (*P. N. Lawrence*) (BMNH).

Further Distribution. Japan and Formosa.

As shown in Table 8 and Text-figs 51–55, the important specific features such as chaetotaxy, position and shape of foretarsal sensillae, structure of the female squama genitalis, etc. of the Melanesian specimens examined agree well with those of *E. sakura*. The measurements of the Melanesian specimens are as follows: foretarsus 83–87 μm (adult), 74–76 μm (maturus junior), 63–65 μm (larva II) and 54–57 μm (larva I), *PR*, *TR*, *EU* and *BS* in adults are 11–12, 5·0, 1·0 and 1·1–1·2 respectively.

E. collarum Yin from China and *E. imbutum* Imadaté from tropical Asia closely resemble *E. sakura*. Whether they are both really distinct from it will only be solved when a considerable number of specimens from different places in Asia are subjected to minute examination.

Table 8

Chaetotaxy of *Eosentomon sakura* from Melanesia

(Dorsal)	Formula	Composition of setae	(Ventral)	Formula	Composition of setae
Th.I	4	1,2	Th.I–II	6–2	*A* 1,2,3, *M*
II–III	6	*A* 2,4, *M*		6	*P* 1,2,3
	16	*P* 1,1*a*,2,2*a*,3,3*a*,4,5	III	6–4	*A* 1,2,3, *M* 1,2
Abd.I	4	*A* 1,2		8	*P* 1,2,2*a*,3
	10	*P* 1,1*a*,2,3,4	Abd.I	4	*A* 1,2
II–IV	10	*A* 1,2,3,4,5		4	*P* 1,2
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	II–III	6	*A* 1,2,3
V–VI	4	*A* 4,5		4	*P* 1,2
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	IV–VII	6	*A* 1,2,3
VII	2	*A* 5		10	*P* 1,2,2*a*,2*a*′,3
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	VIII	0	
VIII	6			7	*P c*,1,1*a*,2
	9		IX–X	4	1,2
IX	4	1,2,3,4	XI	8	
X	4	1,4	Telson	12	
XI	4	3,4			
Telson	9				

Eosentomon solomonense sp. n.

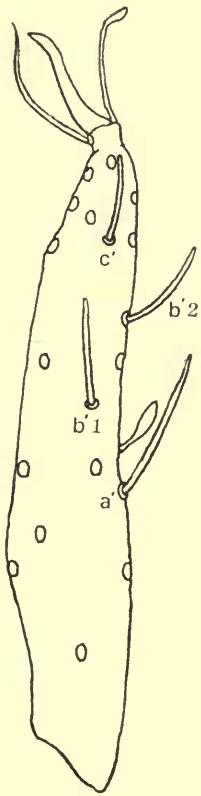
(Text-figs 56–60)

Body length 1000–1100 μm in expanded adults.

Mouthparts normal; clypeal apodeme distinct; labral setae present; pseudoculus rather large, $PR = 8–9$.

Foretarsus 97–98 μm in length, $TR = 5{\cdot}4–5{\cdot}8$ and $EU = 1{\cdot}0$; position and shape of foretarsal sensillae similar to those of preceding species. Dorsal sensilla t–1 situated about halfway between α 3 and α 3′, $BS = 1{\cdot}1$; apex of exterior sensilla a surpasses level of α 3; interior sensilla b'–1 present. Empodium of hind tarsus short and less than one-fifth claw length.

Chaetotaxy (Table 9) similar to that of *E. gimangi* Imadaté from Borneo except for absence of A 3 on abdominal terg. IV; on terg. V–VI A 1, 2 and 3 absent; on terg. VII P 1a situated at posterior margin with the other accessory setae and A 1, 2, 3 and 4 absent; P 2 and 1″ not displaced anteriorly on terg. VIII; on terg. X–XI four pairs of tergal setae, 1, 2, 3 and 4 present. Female squama genitalis similar to that of *E. melanesiense* and *sakura*.



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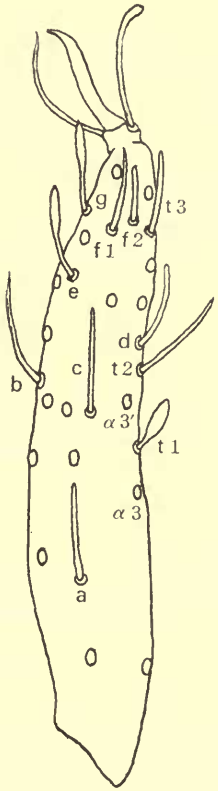

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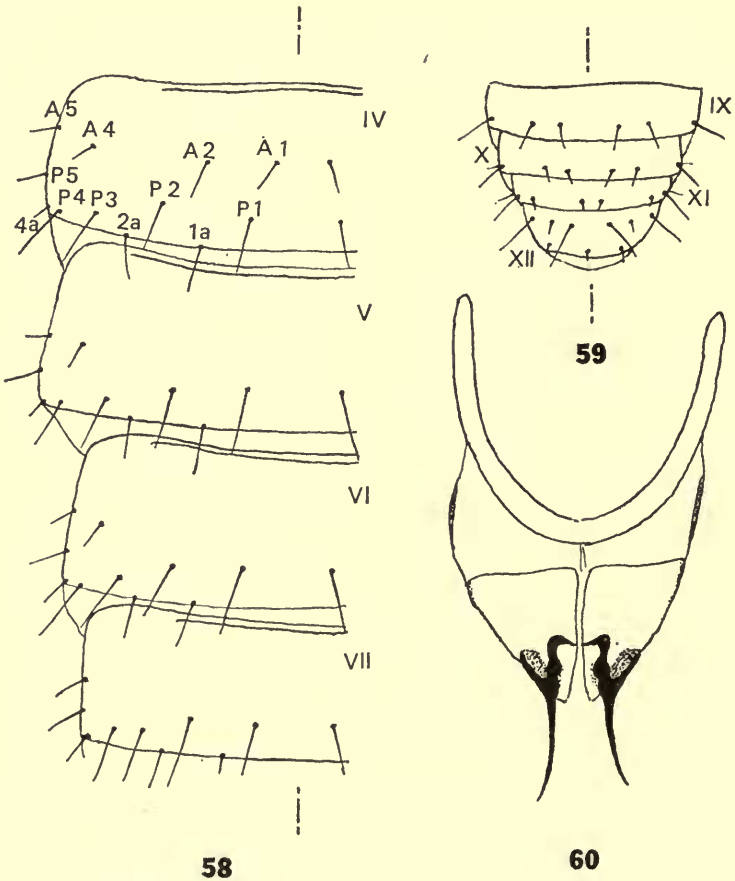
FIGS 56, 57. *Eosentomon solomonense*. Foretarsus, (56) interior and (57) exterior views.

Holotype ♂, Solomon Islands: Guadalcanal, Mt Austen, 13.xi.1964 (*P. J. M. & P. Greenslade*) (BMNH).

Paratypes. Solomon Islands: Mono, Falomai, 20.ix.1965 (*P. J. M. & P. Greenslade*), 1 ♂, 1 l I; Wagina, 25.v.1966 (*P. J. M. & P. Greenslade*), 1 ♀; Nusatupe, Gizo, 4.vi.1965 (*P. J. M. & P. Greenslade*), 1 ♀; Nggela, Soso, 2.xii.1965 (*P. J. M. & P. Greenslade*), ? 1 l I; Guadalcanal, Mt Austen, 13.xi.1964, 1 ♂, 11.ii.1966, 2 ♀ (all *P. J. M. & P. Greenslade*) (all BMNH).

This species is closely related to the preceding three species in many respects, e.g., the position and shape of the foretarsal sensillae, the structure of the female squama genitalis, etc., but it is different in the presence of four pairs of tergal setae on abdomen X–XI, in the absence of *A* 3 on terg. IV, in the position of *P* 1*a* on terg. VII and in the relative size of the pseudoculus. On the other hand, this species is also similar to *E. gimangi* Imadaté from Borneo, but it is distinguished



Figs 58–60. *Eosentomon solomonense*. 58, 59, tergal chaetotaxy of (58) abd. IV–VII and (59) abd. IX–XII; 60, female squama genitalis.

from the latter by the relative length of foretarsal sensilla *a* and the size of pseudoculus as well as by the absence of *A* 3 on terg. IV.

One female specimen from Honiara, Guadalcanal, 4.viii.1962 (*Noona Dan Expedition*) is apparently a related form of this species, but it is rather small in size (foretarsus 60 μm) and the chaetotaxy is consistent with that of *E. udorni* Imadaté from Thailand except for the presence of *A* 2 on abdominal terg. V–VI.

TABLE 9

Chaetotaxy of *Eosentomon solomonense*

(Dorsal)	Formula	Composition of setae	(Ventral)	Formula	Composition of setae
Th.I	4	1,2	Th.I–II	6–2	*A* 1,2,3, *M*
II–III	6	*A* 2,4, *M*		6	*P* 1,2,3
	16	*P* 1,1*a*,2,2*a*,3,3*a*,4,5	III	6–4	*A* 1,2,3, *M* 1,2
Abd.I	4	*A* 1,2		8	*P* 1,2,2*a*,3
	10	*P* 1,1*a*,2,3,4	Abd.I	4	*A* 1,2
II–III	10	*A* 1,2,3,4,5		4	*P* 1,2
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	II–III	6	*A* 1,2,3
IV	8	*A* 1,2,4,5		4	*P* 1,2
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	IV–VII	6	*A* 1,2,3
V–VI	4	*A* 4,5		10	*P* 1,2,2*a*,2*a*′,3
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	VIII	0	
VII	2	*A* 5		7	*P c*,1,1*a*,2
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	IX–X	4	1,2
VIII	6		XI	8	
	9		Telson	12	
IX–XI	8	1,2,3,4			
Telson	9				

Eosentomon guadalcanalense sp. n.

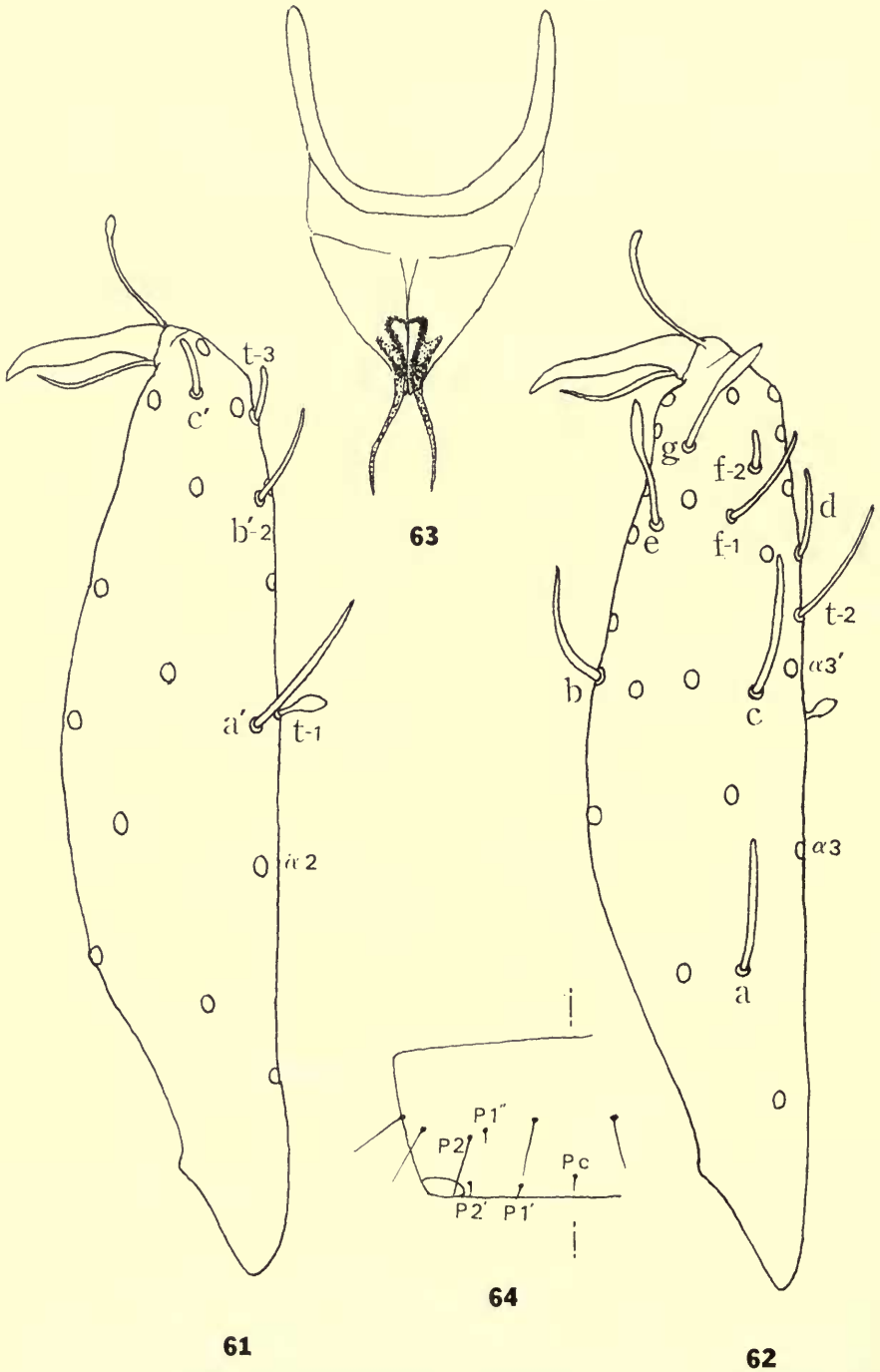
(Text-figs 61–64)

Body length 900–1200 μm in expanded adults.

Mouthparts normal, but labral setae not visible; clypeal apodeme indistinct; pseudoculus of medium size, $PR = 10$.

Foretarsus 95 μm in length, $TR = 5{\cdot}9$ and $EU = 0{\cdot}8$; position and shape of foretarsal sensillae similar to those of *E. imadatei* Tuxen from Australia; dorsal sensilla *t*–1 placed slightly proximally to α 3′, BS = 1·4; *t*–2 is thin; t–3 rather small; exterior sensilla *a* normal and apex slightly surpassing level of α 3; *c* a little broadened, *f*–2 is short and situated distally to *f*–1; spatulate *e* and *g* normal; interior sensilla *a*′ stout and placed almost level with *t*–1; *b*′–1 absent; *c*′ relatively short. Empodium of hind tarsus short and less than one-fifth claw length.

Thoracic chaetotaxy normal. On abdominal terg. II–III, *P* 4*a* not visible; *A* 3 on terg. II–VI and *A* 1 and 3 on terg. VII absent; *P* 1*a* on terg. VII situated at posterior margin with



FIGS 61–64. *Eosentomon guadalcanalense*. 61, 62, foretarsus, (61) interior and (62) exterior views; 63, female squama genitalis; 64, chaetotaxy of abdominal terg. VIII.

the other accessory setae; *P* 2 and 1″ on terg. VIII displaced anteriorly as shown in Text-fig. 64; two anterior setae present on stern. VIII. Female squama genitalis similar to that of *E. solare* and *solomonense*.

Maturus junior. Foretarsus 82 μm, *BS* = 1·4 and *TR* = 5·8; the specific characters such as position and shape of foretarsal sensillae, chaetotaxy (except for stern. XI), etc., similar to those of adult.

Larva I. Foretarsus 66 μm; position and shape of foretarsal sensillae similar to those of maturus junior.

Chaetotaxy as in Table 10.

Holotype ♀, Solomon Islands: Guadalcanal, Lunga, viii. 1966 (*P. J. M. & P. Greenslade*) (BMNH).

Paratypes. Same data as holotype, 5 ♀, 1 m.j., 1 l I.

E. guadalcanalense is similar to *E. imadatei* Tuxen from Australia, but differs from it in the displacement of *P* 2 and 1″ on abdominal terg. VIII, in the presence of *A* 1 on terg. VI and in the shape of the corpus processus of female squama genitalis.

Table 10

Chaetotaxy of *Eosentomon guadalcanalense*

(Dorsal)	Formula	Composition of setae	(Ventral)	Formula	Composition of setae
Th.I	4	1,2	Th.I–II	6–2	*A* 1,2,3, *M*
				6	*P* 1,2,3
II–III	6	*A* 2,4, *M*			
	16	*P* 1,1*a*,2,2*a*,3,3*a*,4,5	III	6–4	*A* 1,2,3, *M* 1,2
				8	*P* 1,2,2*a*,3
Abd.I	4	*A* 1,2			
	10	*P* 1,1*a*,2,3,4	Abd.I	4	*A* 1,2
				4	*P* 1,2
II–III	8	*A* 1,2,4,5			
	14	*P* 1,1*a*,2,2*a*,3,4,5	II–III	6	*A* 1,2,3
				4	*P* 1,2
IV–VI	8	*A* 1,2,4,5			
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	IV–VII	6	*A* 1,2,3
				10	*P* 1,2,2*a*,2*a*′,3
VII	6	*A* 2,4,5			
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	VIII	2	*A*
				7	*P c*,1,1*a*,2
VIII	6				
	9		IX–X	4	
IX–XI	8	1,2,3,4	XI	8	
Telson	9		Telson	12	

Eosentomon notiale sp. n.

(Text-figs 65–68)

Body length 670–750 μm in expanded adults.

Mouthparts normal; labral setae not visible, but clypeal apodeme distinct; pseudoculus of medium size, *PR* = 10.

Foretarsus 57–62 μm in length, *TR* = 5·7–6·1 and *EU* = 0·8; position and shape of foretarsal sensillae similar to those of *E. guadalcanalense*; dorsal sensilla *t*–1 placed slightly proximally

to α 3′, *BS* = 1·3; interior sensilla *a′* situated about halfway between α 3 and α3′; *b′*–1 absent. Empodium of hind tarsus distinctly elongate and more than one-third claw length.

Thoracic chaetotaxy normal. Abdominal terg. II–VI with five pairs of anterior setae; *A* 1 and 3 missing on terg. VII and *P* 1*a* is situated at posterior margin with the other accessory setae; *P* 2 and 1″ on terg. VIII displaced anteriorly; two anterior setae present on stern. VIII.

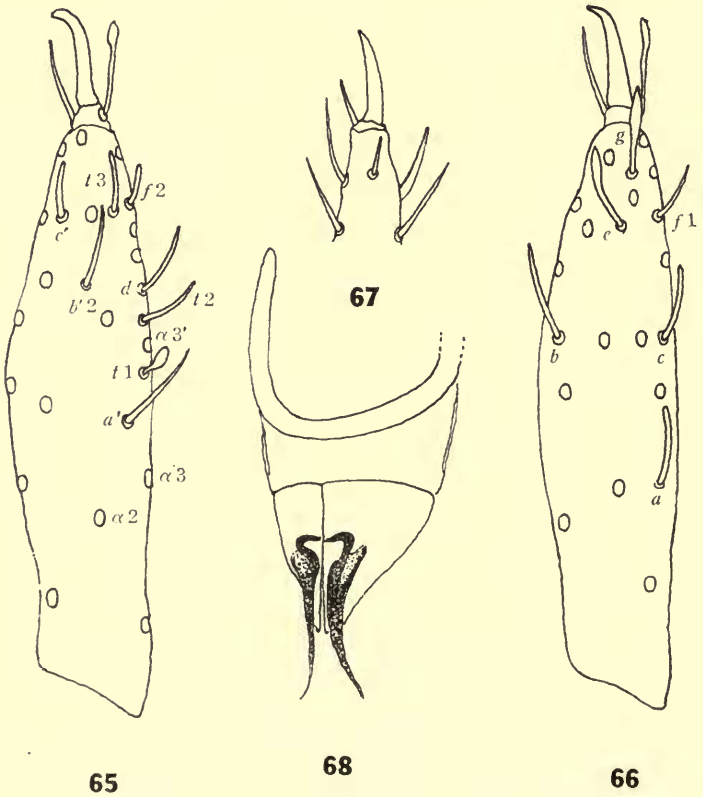
Female squama genitalis similar to that of the previous species.

Maturus junior. Foretarsus 48–50 μm. Except for absence of setae 2 and 4 on abdominal stern. XI, the specific features such as chaetotaxy, position and shape of foretarsal sensillae similar to those of adult.

Chaetotaxy as in Table 11.

Holotype ♀, Solomon Islands: Santa Isabel, Buala, 14.xii.1964 (*P. J. M. & P. Greenslade*) (BMNH).

Paratypes. Solomon Islands: Santa Isabel, Buala, 14.xii.1964 (*P. J. M. & P. Greenslade*), 1 ♀; Guadalcanal, Mt Austen, 11.ii.1966, 1 ♂, 1 ♀, 10.viii.1966, 2 ♀ (all *P. J. M. & P. Greenslade*); G., Kukum, vi.–vii. 1966 (*P. J. M. & P. Greenslade*), 1 ♀ (all BMNH).



Figs 65–68. *Eosentomon notiale*. 65, 66, foretarsus, (65) interior and (66) exterior views; 67, distal part of hindtarsus; 68, female squama genitalis.

This species is similar to the preceding species, *E. guadalcanalense*, in some important features such as the position of the foretarsal sensilla *t*–1 and the displacement of *P* 2 and 1″ on abdominal terg. VIII as well as in the presence of anterior setae on stern. VIII, but it differs in the long empodium of the hind tarsus and in the position of the foretarsal sensilla *a′* as well as in body size.

TABLE 11

Chaetotaxy of *Eosentomon notiale*

(Dorsal)	Formula	Composition of setae	(Ventral)	Formula	Composition of setae
Th.I	4	1,2	Th.I–II	6–2	*A* 1,2,3, *M*
				6	*P* 1,2,3
II–III	6	*A* 2,4, *M*	III	6–4	*A* 1,2,3, *M* 1,2
	16	*P* 1,1*a*,2,2*a*,3,3*a*,4,5		8	*P* 1,2,2*a*,3
Abd.I	4	*A* 1,2	Abd.I	4	*A* 1,2
	10	*P* 1,1*a*,2,3,4		4	*P* 1,2
II–VI	10	*A* 1,2,3,4,5	II–III	6	*A* 1,2,3
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5		4	*P* 1,2
VII	6	*A* 2,4,5	IV–VII	6	*A* 1,2,3
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5		10	*P* 1,2,2*a*,2*a′*,3
VIII	6		VIII	2	*A*
	9			7	*P c*,1,1*a*,2
IX–XI	8	1,2,3,4	IX–X	4	1,2
Telson	9		XI	8	
			Telson	12	

The combination of unusual characters such as the position of *t*–1, the displacement of *P*2 and 1″ on terg. VIII and the long empodium of hind tarsus, etc., are also found in *E. saharense* Condé and *E. simile* Condé from Africa, although both African forms have *b′*–1 on the foretarsus.

One female specimen (foretarsus 50 μm) and a larva II from New Britain, Valoka, 13.vii.1962 (*Noona Dan Expedition*) have similar chaetotaxy to this species, but the displacement of *P* 2 and 1″ on terg. VIII and the long empodium of the hind tarsus are not present.

Eosentomon noonadanae sp. n.

(Text-figs 69–75)

Body length 800 μm in the holotype.

Mouthparts normal, but not very protruded in the holotype; labral setae present; clypeal apodeme distinct; pseudoculus of medium size, *PR* = 11.

Foretarsus 63 μm in length, *TR* = 5·7 and *EU* = 1·0; dorsal sensilla *t*–1 close to α 3, *BS* = 0·9; *t*–2 and *t*–3 normal; exterior sensilla *a* relatively short; *c* slightly broadened; spatulate

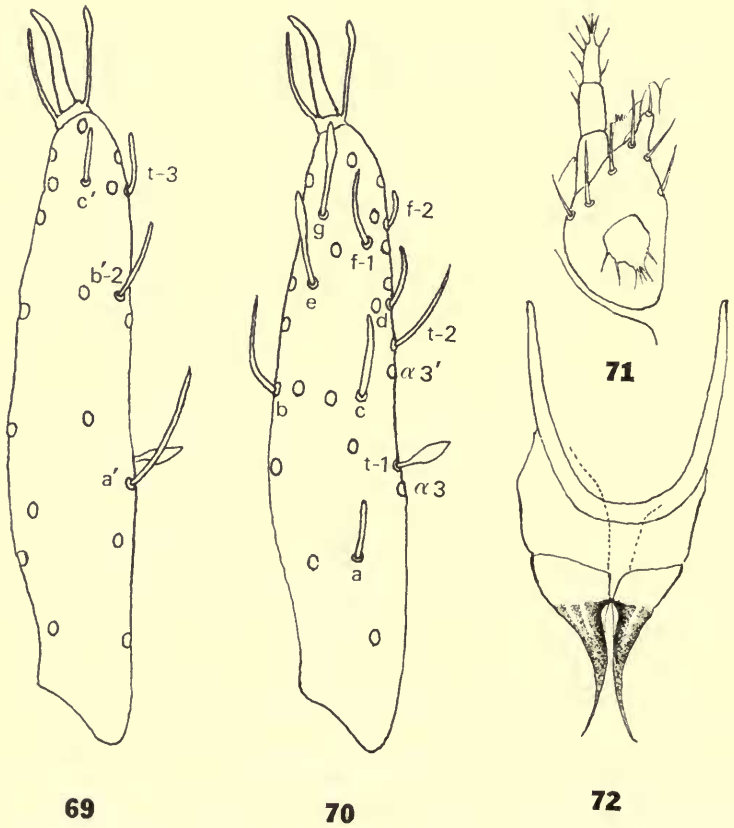
sensillae *e* and *g* present; interior sensilla *a'* stout; *b'*–1 absent. Hind tarsal empodium short and less than one-fifth claw length.

Thoracic chaetotaxy normal. On abdominal terg. II–VI the principal setae, *P* 1, 3 and 4 on posterior row, placed at posterior margin in line with accessory setae *P* 1*a* and 2*a*, which are a little longer than the principal ones, but *P* 2 and 5 are situated distinctly anterior to the other posterior setae. *A* 2 and 3 on terg. III and *A* 2, 3 and 5 on terg. IV–VI lacking. On terg. VII, *P* 1, 2, 4 and 5 situated anterior to the other posterior setae, *P* 1*a*, 2*a*, 3 and 4*a*, and all anterior setae absent. *P* 2 and 1'' on terg. VIII not displaced. On abdominal stern. I–VII, the pair of *P* 1 missing and one central seta, *Pc*, is present instead of *P* 1; on stern. IV–VII, *A* 3 lacking.

Abdominal appendages I–III normal and provided with 5 setae each.

Female squama genitalis characterized by shape of caput processus, which is semi-circularly rounded, corpus processus divided by deep incisions and coalescent with lateral sclerotizations of stylus to form a broad structure terminating in the filum processus.

Chaetotaxy as in Table 12.

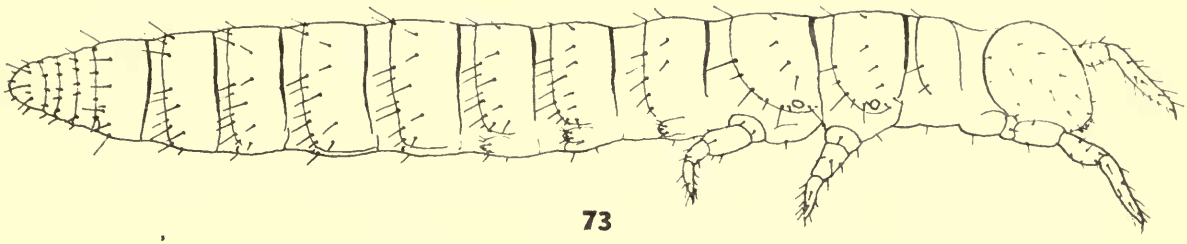


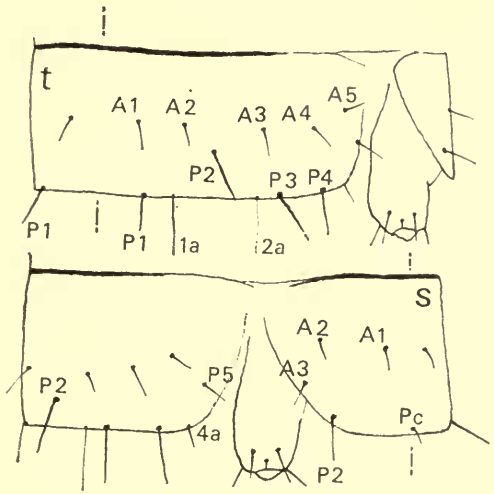
FIGS 69–72. *Eosentomon noonadanae*. 69, 70, foretarsus, (69) interior and (70 exterior views; 71, mouthparts, ventral view; 72, female squama genitalis.

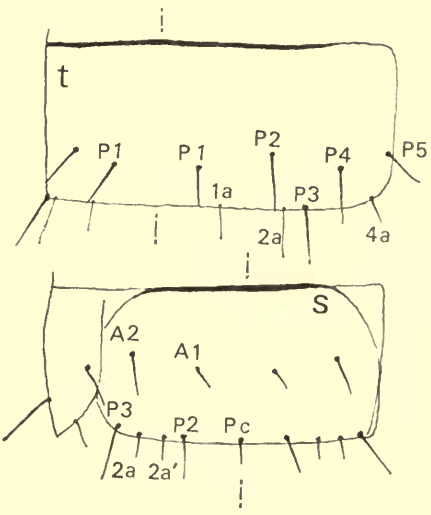
Holotype ♀, BISMARCK ARCHIPELAGO: New Britain, Valoka, 13.vii.1962 (*Noona Dan Expedition*) (UZM).

This species differs strikingly from all other eosentomids in the peculiar chaetotaxy of its abdominal segments, viz. the displacement of *P* 2 on abdominal terg. II–VI, the absence of *A* 3 on stern. IV–VII and of *P* 1 on stern. I–VII, the presence of a central seta, *P c*, on stern. I–VII, etc., and in the shape of the female squama genitalis, which shows some slight similarity to that of *E. yosemitense* Ewing from California.

It seems likely that these characters are significant enough to establish a new genus, but we prefer not to describe it as such, since only one specimen is known.







FIGS 73–75. *Eosentomon noonadanae*. 73, dorsolateral view; 74, chaetotaxy of abd. II; 75, chaetotaxy of abd. VII (t = tergum, s = sternum).

TABLE 12

Chaetotaxy of *Eosentomon noonadanae*

(Dorsal)	Formula	Composition of setae	(Ventral)	Formula	Composition of setae
Th.I	4	1,2	Th.I–III	?	
II–III	6	*A* 2,4, *M*	Abd.I	4	*A* 1,2
	16	*P* 1,1*a*,2,2*a*,3,3*a*,4,5		3	*P c*,2
Abd.I	4	*A* 1,2	II–III	6	*A* 1,2,3
	10	*P* 1,1*a*,2,3,4		3	*P c*,2
II	10	*A* 1,2,3,4,5	IV–VII	4	*A* 1,2
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5		9	*P c*,2,2*a*,2*a*′, 3
III	6	*A* 1,4,5	VIII	0	
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5		7	*Pc*,1,1*a*,2
IV–VI	4	*A* 1,4	IX–X	4	1,2
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5	XI	8	
VII	0		Telson	12	
	16	*P* 1,1*a*,2,2*a*,3,4,4*a*,5			
VIII	6				
	9				
IX–XI	8				
Telson	9				

GENERAL DISCUSSION

ECOLOGY.

Very little can be said about the ecology, first of all because of the relatively small numbers of each species. For almost all habitats where its character is mentioned, be it for the Noona Dan or Greenslade collections, only 'litter and soil' is stated. According to Greenslade & Greenslade (1968) 'litter' refers to the upper, organic, litter and humus layers, and 'soil' to mineral material below. This is not very informative as to the whereabouts of the Protura, but we should think that they are found, as elsewhere, particularly in the uppermost 5 cm, the layer with a high organic content being shallow in tropical regions (Greenslade, 1969, and the authors' personal observations).

A little more may be said about the localities. Almost all the Noona Dan samples and most of the Greenslade samples are from lowland forest soil, but a few are from higher altitudes: Mt Austen on Guadalcanal (c. 300 m), Lemkamin on New Ireland (900 m), Mt Jonapau (1100 m) and Mt Popamanaseu on Guadalcanal (1500 m and 2100 m). On Mt Austen almost all the known species have been found; it is, in fact, the only locality for *Condeellum crucis*. But at higher altitudes only two species have been found, viz. *Eosentomon oceaniae* and *melanesiense*. These two are the commonest of all Proturan species mentioned in this paper and are found in almost all localities, highland and lowland. So it appears that a

special mountain fauna can be distinguished simply by only a few of the most eurytopic and widespread species being able to withstand the higher altitudes.

It might be considered wise to compare the fauna at different times of the year, though only *Eosentomon oceaniae* yields enough material of all stages for a tentative evaluation. The result is, as might have been expected, that all stages seem to be found all the year round. Further ecological information must await more thorough and methodical collecting.

Zoogeography.

The distribution of the 13 species in the Bismarck Archipelago and Solomon Islands is shown in Table 13 (p. 372).

Only two of these species are known from outside the Bismarck-Solomon group: *Eosentomon oceaniae*, which is known from North Queensland, Australia, and *Eosentomon sakura*, known from Japan and Formosa and probably also China and Thailand. Both are widespread over the Bismarck-Solomon group, the first named being the commoner.

In his papers (1968; 1969) P. J. M. Greenslade proposes an origin of the Solomon fauna in New Guinea, spreading west to east via the Bismarck Archipelago. Further, he suggests that colonization has been from larger to smaller islands and depends on the width of the water gaps. He states possible ways of expansion and concludes (1969: 275) for the Solomon Islands that there is 'a high incidence of endemics on San Christoval' and that some 'taxa are restricted to two or more of the islands extending from Bougainville to Nggela'; also that there is a 'fauna size' (number of taxa) correlation with the area of the island.

Unfortunately the Proturan fauna of New Guinea is not known, but the material in the present collection (124 specimens from the Bismarck Archipelago and 326 from the Solomon Islands) might be thought sufficiently large and widespread (37 localities on 21 islands) to show or at least confirm some parts of Greenslade's propositions. This seems not to be the case.

There are four endemic species among the twelve. (1) *Condeellum crucis*, known from several specimens from only one locality on Guadalcanal. (2) *Berberentulus rennellensis*, known from three specimens from Rennell. (3) *Eosentomon guadalcanalense*, known from several specimens from only one locality (another) on Guadalcanal. (4) *Eosentomon noonadanae*, known from one specimen from New Britain. On the other hand San Christoval has only one species so far, viz. *Eosentomon sakura*, widespread in the area and beyond.

Almost all the species (ten of the thirteen) have been found on Guadalcanal. This leaves a special faunal element on Bougainville – Nggela out of the question, and it does not indicate a fauna size-area correlation either.

Two species show, however, an interesting distribution. (a) *Silvestridia solomonis* which was originally found on Guadalcanal in 1958; ten more specimens have been found during the present investigation from Guadalcanal, and an additional, single specimen on Ndeni of the Santa Cruz group to the far east of the Solomon Islands. It is furthermore the only species and specimen found on these islands. (b) *Berber-*

Table 13

Distribution of the known *Melanesian Protura*

	Island	*S. solomonis*	*B. rennellensis*	*B. buchi*	*G. greensladei*	*C. crucis*	*E. oceaniae*	*E. melanesiense*	*E. solare*	*E. sakura*	*E. solomonense*	*E. guadalcanalense*	*E. notiale*	*E. noonadanae*
1–2.	Mussau			×			×	×						
3.	Lavongai						×	×						
4–5.	Dyaul						×		×					
6.	New Ireland						×							
7.	Duke of York				×		×		×					
8.	New Britain			×			×	×		×				×
9.	Mono										×			
10.	Choiseul						×		×					
11.	Wagina							×			×			
12.	Nusatupa										×			
13.	Kolombangara						×	×						
14–15.	Santa Isabel				×		×	×					×	
16.	Russell						×		×					
17–18.	Nggela				×		×		×	×	×			
19–20.	Savo	×					×	×		×				
21–29.	Guadalcanal	×			×	×	×	×	×	×	×	×	×	
30.	Malaita						×							
31.	San Christoval									×				
32.	Bellona						×							
33–34.	Rennell		×				×		×					
35.	Ndeni	×												

entulus buchi (several specimens) found on Mussau and (especially) New Britain of the Bismarck Archipelago, but not on the Solomon Islands in spite of the fairly large collection. On the other hand it is closely related to *Berberentulus rennellensis* from Rennell. Whether this confirms or not Greenslade's (1968 : 191) supposition of a Louisade affinity of the Rennell fauna we are unable to say since the Proturan fauna of New Guinea, as mentioned above, and of the Louisades is quite unknown, as is that of New Hebrides and New Caledonia. Such a relationship seems not to be upheld by various authors in the volumes of *The Natural History of Rennell.*

Concluding it may be said that there is a distinct faunal connection between the Bismarck Archipelago and the Solomon Islands, both faunas probably originating in East Asia, though links are also shown with the Australian fauna. Guadalcanal harbours the richest fauna and in addition has two endemics. It is probable that in forming these conclusions we have overstretched the amount of evidence available.

Taxonomy.

Both as to number of species and number of specimens the family Eosentomidae by far outnumbers the two other families. This seems reasonable since, generally speaking, the *Eosentomon* species are eurytopic, whilst the other Protura are more exacting in their demands and are stenotopic (Tuxen, 1949). The differences

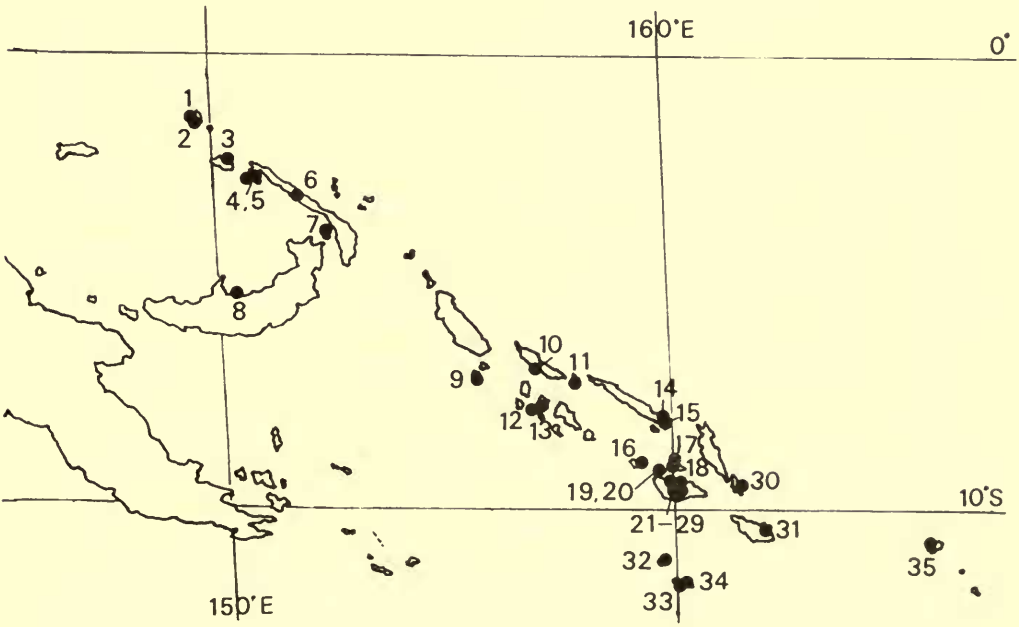


Fig. 76. Map showing the distribution of the collecting sites. The numbers correspond to those cited in the list of localities (p. 334).

between the majority of species within this genus are also smaller, often merely a matter of chaetotaxy, than in the other families, so a species relationship is in many cases difficult to state.

It is, however, interesting to note that some of the species here mentioned are fairly closely related *inter se*; this holds true, for example, of *Eosentomon melanesiense, solare, sakura,* and *solomonense,* forming as it seems a small group of their own. But this is not expressed in their geographical distribution where they do not always occur together nor do they always replace each other.

A curious tendency may be seen in the acerentomids, namely a convergence in the evolution of the foretarsal sensillae and the chaetotaxy in the four species of the three genera *Silvestridia, Berberentulus* and *Gracilentulus* of the present fauna. The position of the foretarsal sensillae *c* and *d* as well as the size of *a* and *b* are common to the four species of these three different genera and more or less different from other species of the same genera. Also a distinct reduction of anterior setae on the abdominal terga V–VIII is common to these four species. These common features are clearly due to convergence, but the reason is not obvious. It is likely that such convergence will be seen not only in morphological characters, but also in their biology.

It is also significant that no two (or more) acerentomids have been found coexisting at the same collecting site in this collection. There seems thus to be a distinct habitat segregation in the same way as it was shown for Japanese Protura (Imadaté, 1973).

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INDEX

Principal page references are in **bold**; pages on which there are figures are in *italics*.

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